

LITTLE THINGS
THAT MATTER.

FOR THOSE WHO BUILD.

By EDWIN GUNN, A.R.I.B.A.

J.O. Thompson.

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THE "LITTLE THINGS THAT MATTER" SERIES. VOLUME I

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BY

EDWIN GUNN, A.R.I.B.A.

SECOND EDITION REVISED



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PREFACE TO THE SECOND EDITION

THE author has been much gratified at the reception accorded to his modest effort. In preparing the work for re-issue he has generally revised the subject matter and included a few additional hints and details with further illustrations where necessary to elucidate points with which he has come in contact since the first appearance of this little book.

PREFACE TO THE FIRST EDITION

THE author makes no claim to anything sensational in the matter of these notes. Some of the expedients are very old ones, some are possibly new, and these latter are not all of his own origination. He believes that every architect who strikes or avoids a "snag" ought to open the matter to his fellows. Quacks secrete, scientists publish. Verb. sap.

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CHAPTER 1

Choice of site—damp-course—raft foundations—datum pegs.

THE architect is not usually called in until the site is selected, but in those rare instances where a client of exceptional intelligence invokes aid in the choice, there are a few considerations which should be borne in mind when no marked characteristics attach to particular sites under judgment. **Choice of Site.**

I would counsel a client looking for an ordinary "building plot" always to have as much frontage as he can afford—it will be reflected in increased convenience in plan and quite probably some saving in cost of building. There are strong reasons for preferring a site on the south side of the roadway—i.e., one in which north windows face the road and south to the garden, which is then enjoyed by the main windows, while entrance hall, staircase, kitchen, and larder, etc., look north towards the road, resulting in the maximum of privacy and sun for the best rooms. East and west sites, of course, get sun all round during each day, but unless ample frontage allows the house to stand free from possible obstruction by adjoining buildings on the south side this advantage may prove illusory, as during the winter months when the sun is almost powerless except at midday, its relatively low altitude makes it often obstructed by the next house.

Damp-course.

Prominent among the little sins of commission and omission which usually produce results in trouble and expense most out of proportion to their apparent grievousness, are those connected with the placing of the damp-course, which everyone now recognizes as essential in the base of all walls. It is matter of common knowledge that the damp-course should be at least 6 in. above ground line, and below the level of any timber; but in the course of adapting this perfectly simple proviso to the solid bricks and mortar there are occasions where a less simple problem is presented.

The commonest of all causes of dry rot in the lower floor of a house is certainly the awkward junction between solid floors of cement, or tiles (as in a scullery), and boarded floors of ordinary joist construction in rooms adjoining. Fig. 1 illustrates the point of weakness. To comply with the second requisite postulated above the damp-course is at least 7 in. below the floor line. This brings it uncomfortably near the underside of the adjoining solid floor—or, in these skimmed days of 4 in. concrete, actually below it, and in consequence leaves the brickwork above in contact with the moisture-conducting earth. The result is damp rising in wall and plaster, spoilt decorations, and rot in skirtings and floors. The remedy is to fill in with concrete as shown in Fig. 1A. That the ground surface below the interior of buildings normally remains moist was brought home to many during the drought of 1921 by a wholly unprecedented and bodily shrinkage which allowed surface concrete, with all that it carries, to settle to a surprising extent—probably to rise later as the ground again swelled. *En passant*, this manifestation has indicated the desirability of supporting joisted ground floors solely

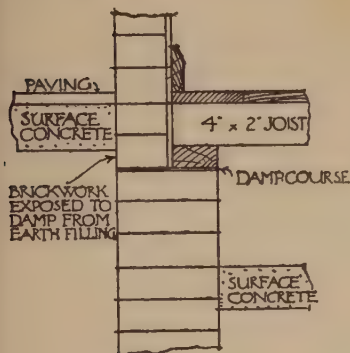


FIG. 1.

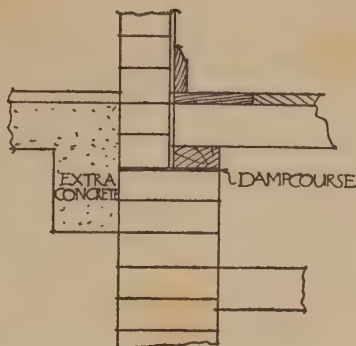


FIG. 1A.

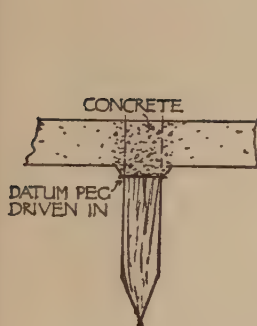


FIG. 2.

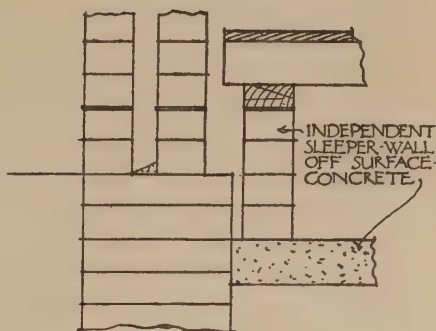


FIG. 3.

from one source, i.e., rather than building in the joist ends to external and cross walls founded at a greater depth than the surface concrete bearing the intermediate sleeper walls, an independent sleeper wall, as Fig. 3, should be provided. This method has further obvious advantages when used in conjunction with the now usual 11 in. cavity walling as shown.

The most difficult situation of all in which to intro-

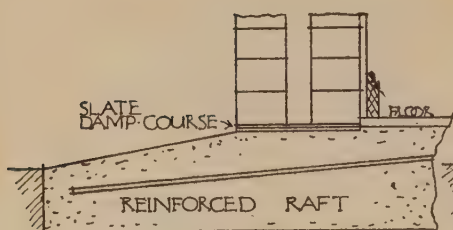


FIG. 4.

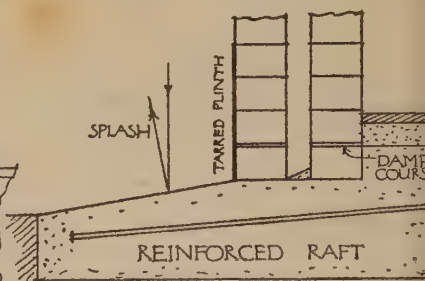


FIG. 5.

duce effectively a damp-course is in the thin reinforced concrete raft construction, which is now becoming normal in fenny and waterlogged districts. It is often placed as in Fig. 4, but in this case the continuous damp-course bridging the cavity, though efficient against penetration from below, yet serves as an impervious collecting surface for any moisture penetrating the hollow wall from outside, permitting the inner thickness to absorb any such at its most vulnerable point. Dividing the damp-course improves matters but little, unless it can be raised above the bottom of the cavity also as in Fig. 5. To make this effective necessitates an additional layer of impervious concrete above the actual raft surface so as to raise the wood flooring and internal plasterwork out of contact with material liable to be saturated with moisture.

Raft Foundations.

While on the subject of raft construction there are further points it may be helpful to make clear. This type of foundation is applicable to cases where (a) a sound and incompressible foundation is only obtainable at a depth which would inflate the cost of normal trench foundations out of all proportion to the load to be carried, or (b) where waterlogged ground makes more than the shallowest of trenches expensive and

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difficult. In either case, the principle involved is to rely on spread and homogeneity of the foundation slab for minimizing and equalizing the settlement, which it is recognized will take place. On the general question of the design of raft buildings a closely reasoned and admirable exposition appears in the Ministry of Agriculture's Manual on the Equipment of Small Holdings, which, by permission, is extracted therefrom as follows :—

“ The construction of buildings on fen land calls for special comment. The two main difficulties are: (a) The unstable nature of the foundations; (b) Drinking water supply.

“ (a) A study of the buildings in the fen districts shows that sooner or later settlements take place in all buildings unless very special precautions have been taken with regard to the foundations. These initial precautions are in themselves often of a costly nature and yet do not always suffice to save the buildings from settlements. Once settlements occur depreciation in the value of the building begins and maintenance becomes increasingly costly, to say nothing of the discomfort of the tenants.

“ (b) Owing to the cost and difficulty of well sinking, rain water is almost universally the source of the drinking and household supply.

“ To meet these two factors, certain elementary principles in design and construction become of paramount importance, and it is believed that if these principles are kept steadily in view in the design and construction of cottages and farm equipment, much future expense can be saved. It will be noted later that adherence to the principles which govern the first, directly contribute to the saving of expense and increase of efficiency in meeting the second, in pro-

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viding an adequate water supply by a simple and inexpensive method.

“On a real fen soil undoubtedly the safest and most economical form of construction in the long run is reinforced concrete, preferably a complete monolith structure, but in any event a reinforced concrete raft is practically essential as a general foundation.

“Other factors must, however, be considered in the general design and planning. Whether reinforced raft and brick walls or concrete monolith, the weight of the building should be distributed as evenly as possible over the entire floor area, and the square or rectangular type of plan should be adopted.

“Observation of existing fen buildings tends to show that all attachments or projections, any departure from a severely rectangular form, only serve to increase the risk of settlement, and the stable door maxim is in strong evidence, as witness the abundance of extra ties, buttresses and costly underpinning. Gable ends, chimneys on outside walls, walls of unequal height, absence of cross walls, inadequacy of ties, both at floor and ceiling levels and at angles of buildings, all help to increase the chances of early settlements and consequent expense in repair.

“The following general rules may be deduced :—

“(1) Cross walls should be carried through both floors and extend from outside wall to outside wall wherever possible ;

“(2) Floor levels should be constant, and wall plates for the rafters should be continued at one level all round the building. By this means a level eaves is formed all round the house thus greatly facilitating the easy and economical collection of rain water ;

“(3) Apertures should be placed as far from the external angles as possible to ensure a well constructed

and strong corner. Angle ties, in the shape of the old-fashioned dragon piece and tie, should be used and all thrusts of the roof timbers carefully absorbed by adequate collars and purlins;

"(4) By placing chimneys on internal walls the tendency of the outer walls to draw apart is counteracted and moreover the raft is not over-weighted on its outer edges;

"(5) Where a low building is of necessity placed against the main block it should be so planned that any difference in settlement will not cause fracture.

"To sum up: the rectangular plan form, even distribution of weight, adequacy of cross walls and of ties preventing thrust, are the guiding principles, whether the building is of reinforced concrete throughout or of ordinary construction placed on a reinforced raft."*

The further detail points (based on experience) which arise are as follows:—

(1) A confusion between the conflicting principles of trench and raft foundation benefits nobody. If the raft form is adopted it should be shallow, practically on the surface, as in those conditions it is equally effective, and is then no more costly than trench foundations of normal depth and spread.

(2) Whatever reinforcement is adopted—but more particularly if a material in sheet form is used—it is necessary to watch for and check a tendency of workmen and supervisors to lay what is in effect two independent slabs of concrete with the reinforcement between. If it is not practically possible to lay a whole raft in one operation, the best manner of making the join is to leave the edge of the reinforcing material

* Reprinted by permission of the Controller of H.M. Stationery Office.

projecting about a foot, to be embedded in the next day's concrete and lapped by the succeeding sheet.

(3) Since they will necessarily stand above ground and serve as ledges to conduct water into the walls, brick footings would be harmful. They are in any case unnecessary, but I have seen them put.

(4) The projection beyond the external walls of the raft surface (which may be from 18 in. to 24 in.) greatly intensifies the upward splash from heavy rain. This should be countered by weathering as steeply as may be the projecting surface (see Fig. 5), which helps to direct the splash away from the walls as well as ensuring drainage way from the house. As, without increasing considerably the extra material raising the internal floor level, the damp-course must remain rather lower than would otherwise be desirable, it is practically essential that an impervious tarred plinth should be formed in buildings of raft construction.

Datum Pegs.

A common source for the introduction of rot, not only in raft-constructed but in all types of flooring, is the failure to withdraw or effectively to seal down the rough pegs (of usually inferior wood) used as datum or level pegs when laying surface concrete. These perhaps get lightly smeared with cement, but remain in the ground, perforating the supposed impervious layer and affording a ready ingress to fungoid growths. They should be driven completely through, and their holes filled in with cement as soon as the level is reached—and somebody must see that it is done.

CHAPTER 2

Cavity walls—footings—damp-course—openings—floors—
eaves—ventilation of cavity—stretching bond—frames—
weatherproof casements—doors.

CAVITY walls, consisting of two $4\frac{1}{2}$ -in. thicknesses, with a 2-in. cavity, are now being largely adopted in cheap building, owing to the sanction of this form of construction given by the latest model by-laws. While they are greatly superior to 9-in. walls, and sometimes even to 14-in. solid walls, in dryness and non-conduction of temperature differences, their structure requires more thought and care, if they are to be sound, than it sometimes receives, and there are certain qualities (both good and bad) which they possess that do not appear to have been hitherto dwelt upon. Dealing with these latter qualities first, they are:—

**11-in. Cavity
Walls.**

(1) Great rapidity of heat radiation when rooms are warmed and the cavity is freely ventilated from outside. In thicker cavity walls, where the inner wall is 9 in. thick or over, this is not noticeable; but the $4\frac{1}{2}$ -in. skin quickly becomes warmed from within in cold weather, and creates a decided up-current of air in the cavity, fresh cool air flowing in below, and continually carrying off heat in this way. The method of ventilation described later goes some way to remedy this.

(2) Quick drying of walls owing to ready admission of air to mortar. This makes it possible to get buildings ready for healthy occupation in considerably shorter time than usual.

(3) Liability to attack by frost when building, owing to similar reason.

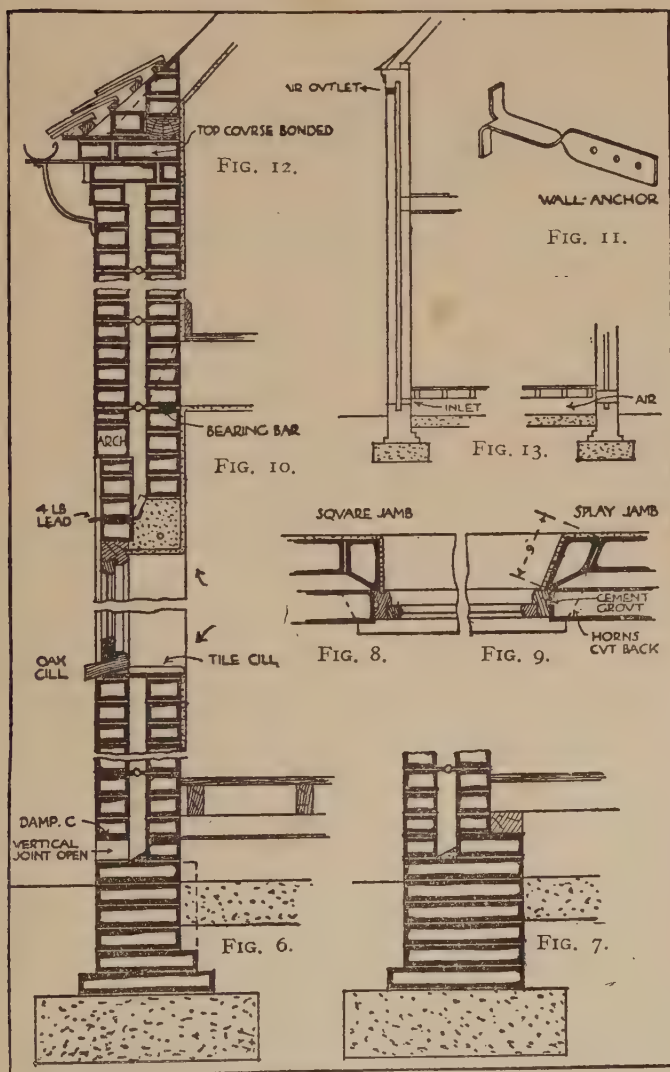
(4) Economy in facing bricks owing to absence of headers; also possibility of use of brick five courses to the foot with ordinary four-course backing without disturbance of bond.

Footings.

The 11-in. wall contains no more bricks than a 9-in. wall, and places no greater load on the foundations. It is therefore reasonable to give its base no greater spread—that is, 18 in., allowing one course of footings to be absorbed by the cavity. As the inner wall carries the bulk of the weight, the full spread should be preserved on this side, but, in order to save cutting, the courses between top of footings and bottom of cavity may be built out as shown by dotted lines (Fig. 6). Where the floor joists require a bearing block, footings may be formed on the inner face (Fig. 7), but a still better arrangement is support by a separate sleeper wall, as shown in Fig. 3.

Damp-course.

The cavity is often stopped on the damp-course, and alternatively is sometimes taken down as far as the footings; both practices are faulty. It must be remembered that the *theory* of the hollow wall is that dampness may penetrate the outer skin, but must stop there, and the *fact* is that some amount of moisture does so penetrate. Its natural course is downwards, and should the damp-course continue through both thicknesses moisture is there arrested in its downward course, and spreads to the inner wall or even to the ground-floor plate, which is usually bedded direct on the damp-course. If, on the contrary, the cavity continues below the ground line, it may become charged with water percolating through from the soil, or the wall is readily displaced while “green” by the ramming of oversite concrete. The



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best place to stop it is below the damp-course, and at least one course above the ground, an angular cement fillet being formed and a few vertical joints left open for the escape of moisture.

Openings.

Door and window openings can be built solid at the jambs, but the point of contact should be reduced as much as possible, which may be done by clipping bricks as shown (Figs. 8 & 9), or a slate damp-course may be built in, as shown by Fig. 14. Frames penetrating the cavity should be avoided when practicable, a workable treatment at jamb, sill, and head being shown also in Fig. 14.

Floors.

The inner wall carries most of the weight, and should not be weakened by building in wood plates to support floor joists, as the whole of the wall above must rest on them, and when shrinkage occurs will settle and probably loosen the ties. A stout hoop-iron bearing bar should be run continuously through the wall to receive joist ends (Fig. 10), every third or fourth joist being spiked to a breeze brick built in to receive it, to give the requisite tie. A still better plan would be to use an American "wall anchor" (Fig. 11), but I have not succeeded in getting these in this country.

Eaves

At the eaves the two skins should be united by building solid for a few courses, which may be done here without bad results, as the outer surface is protected by the roof projection. This ensures the roof load being partially borne by the outer thickness. A simple oversailing enables the work to be bonded without much cutting or waste (Fig. 12), or a close eaves may be formed as in Fig. 28.

Ventilation of Cavity.

It is now generally admitted that fresh air circulation through the cavity is desirable, but certain disadvantages frequently entailed by direct ventilation

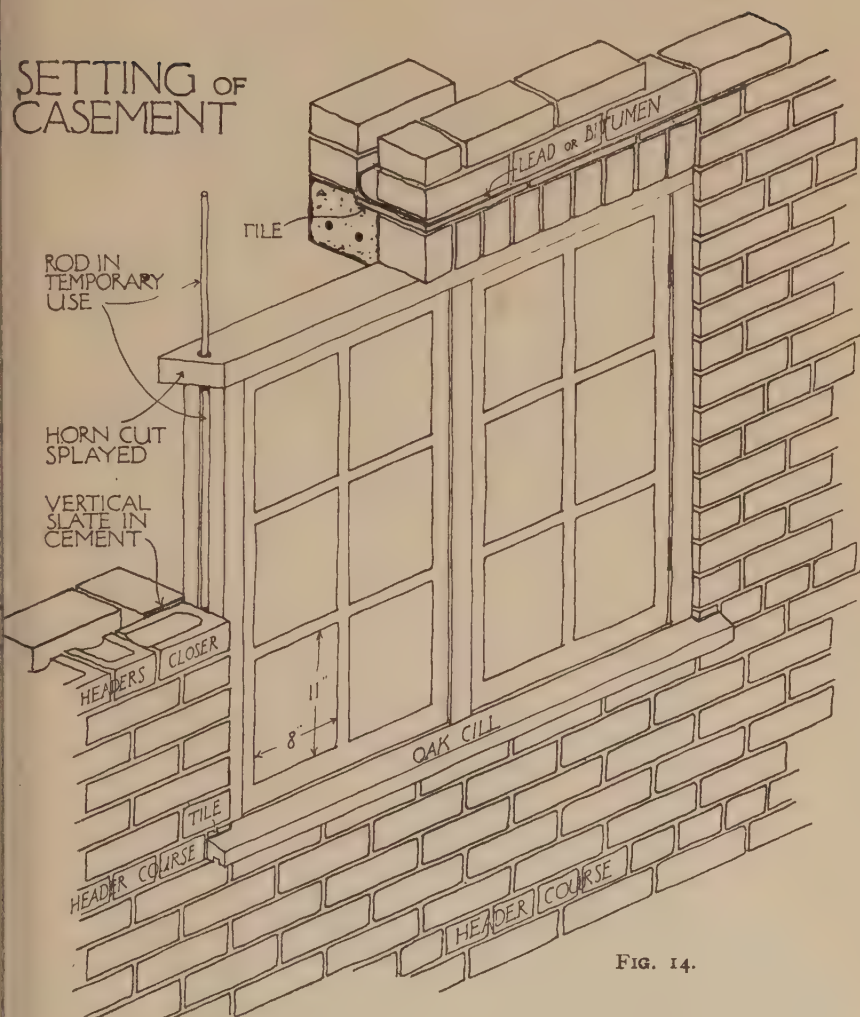


FIG. 14.

have been mentioned. If, however, the inlets to the cavity are formed from within, below the floor space and the outlets at the top just beneath the solid oversailing, two purposes are thereby served. The upcast current produced in the cavity creates a pull on the air below the floors, and greatly assists the usually sluggish ventilation here, by drawing in air from outside through the air bricks communicating with the floor space; and the indirect and consequently slower circulation so set up considerably retards the degree of heat-loss from the rooms. The shafts conducting air from outside to the floor space should be sealed off from the cavity with slates and cement (Fig. 13); and if these are formed (as they usually are) under window openings and the inlets to cavities intermediately, in the piers or plain wall faces, the desired object is achieved.

**Stretching
Bond.**

With the increased use of 11-in. cavity wall construction stretcher bond is becoming increasingly familiar, and certain defects of appearance are usually present. That most frequent results from the necessity of breaking bond, which produces a clumsy join running perpendicularly up the wall. The bad effect of this can be removed if the break in bond is varied in position as frequently as possible. A ready way to do this is to introduce a course of snapped headers every fourth or sixth course in height, which affords an opportunity for the change. According to the softness of the facing bricks used there will always be a proportion of bats, which it is possible to use in this way. The dull appearance of stretcher bond is much improved by this expedient.

Frames.

The setting of frames presents several opportunities for the commission of trifling errors, which yet hurt the effect of the whole. A generally flush effect is

most consonant with cottage building, and this is naturally obtained when the frames (usually 4 in.) are set with their backs in line with the inner face of the outer $4\frac{1}{2}$ in. of cavity walling. This leaves a visible break of about $\frac{1}{2}$ in.—sufficient to give a line—and permits the hardwood cill, 6 in. wide, to project $1\frac{1}{2}$ in. so as to throw off water without the need for further provision. The head of the frame should be sawn off at an angle so that no horns show, as in Fig. 14, and a brick-on-edge course (with two or more courses of tiles to level up to courses if wanted) is sufficient above, the inner wall being carried by a lintel. A brick-on-edge “lintel” does not look sufficient where the frame beneath is recessed more than at most 1 in.

Where wall space above permits, a half-ring semi-circular arch is a pleasant addition, the spandril filling of brick being set flush with frame beneath, so that the line of reveal is carried round by a $\frac{1}{2}$ in. recess. A damp-course of lead or bituminous sheeting must, of course, be set on the head of the wood frame in such a manner as to intercept moisture which may enter the cavity. Where concrete lintels are used, a good method of procedure is to have window frames prepared with a wide groove (say, $\frac{1}{2}$ in. deep, 1 in. wide) and 1 in. centre-bit hole in head above same. When frames are in position the two $\frac{1}{2}$ in. or $\frac{3}{8}$ in. rods to be used in reinforcing the lintel are placed in these grooves, projecting through head at top. On building up to head-level the rods are withdrawn and cement grout poured in and puddled with the rods to remove air bubbles or voids, the rods being then used in *in situ* lintels.

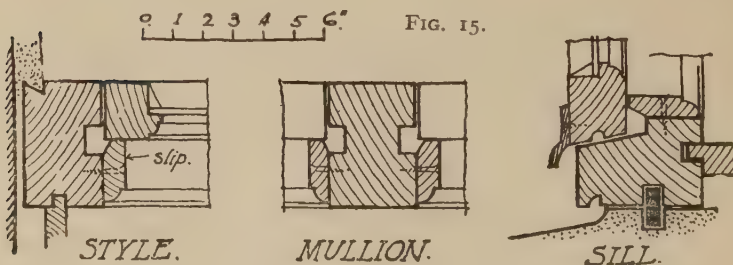
With regard to casement windows, a reasonably weatherproof wood casement, sash and frame of

**Weatherproof
Casements.**

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economical character, is a desideratum. Mr. H. G. Leaske, of P.W.D., Ireland, contributes a sketch of one which has behaved very well in exposed situations on the south-west coast of Ireland, a locality specially favoured by Atlantic gales and driving rain. A large groove is essential, and it should be backed by a fairly tight inner joint. In the stile and mullion section shown (Fig. 15) the groove can be machined very simply, and the detachable slips or beads can be fixed as close up to sashes as is possible without risk of sashes becoming hinge bound. Should the sash "warp or wind" the slips can be refixed as may be necessary.

It is, perhaps, a truism now to insist on the advantages of all windows being based on a standard proportion of pane. Errors in scale still occur, however. Probably the most satisfactory simple rule is to base cottage casements on the two-light casement and frame of a width over-all of 3 ft. 9 in.—each casement, two panes wide, having its panes proportioned in width and height as the square to its diagonal. This gives a pane size of about 8 in. by 11 in. Windows in other multiples are worked out on this basis.



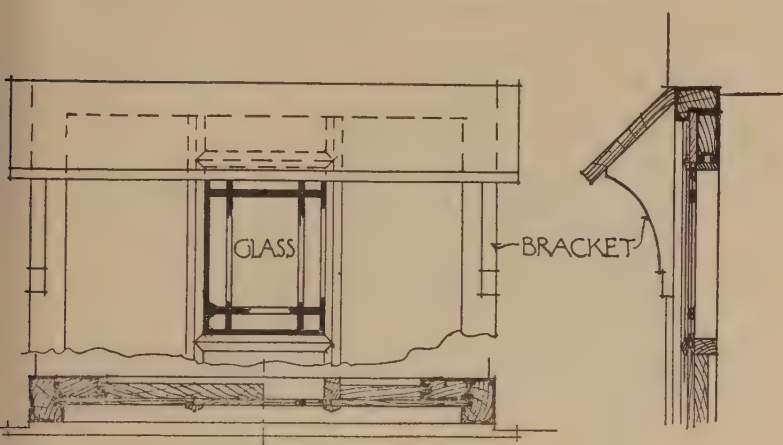


FIG. 16.

In no case is the cottage effect so frequently missed **Doors.** in new work as in external door and canopy. Neither panelled doors with upper part glazed; nor ledged, framed, and braced, filled with V-jointed boarding in narrow widths, look really appropriate, and the suburban-looking little door canopies so often seen are not particularly pleasing. The two essentials to a broad effect are apparent solidity of frame and fewness of parts. An unmoulded frame showing not less than 3 in. on face, and any sort of door if covered externally with wide boards, filleted above joints are invariably satisfactory in effect. A small open panel for light can be easily formed in such a door, with narrow linings. As a hood or canopy nothing gives a better effect than an inclined board from the door head, with brackets or cheeks fixed to the frame just inside the reveals, all as shown in Fig. 16.

CHAPTER 3

Tile work—quoins—jointing—collar roofs—valleys—hips—
gable tilt—slating—mansard roofs—tiling—underlining.

Tile Work.

BESIDE the ordinary uses of plain tiles for weatherings, oversailings, and the like, there are many minor occasions in building where they provide a handy means of fabricating things easily and readily from material at hand. Airbricks, for example, are made quite satisfactorily

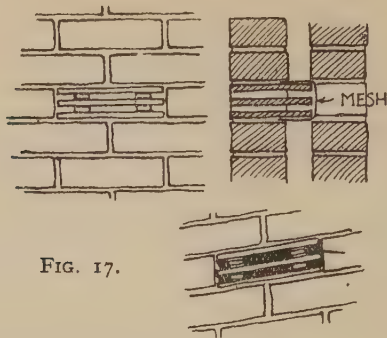


FIG. 17.

by filling up a space 9 in. by 3 in. or 9 in. by 6 in. with plain tiles and slips of tile alternately, and these present the great advantage in cavity-walling that they are deep enough to penetrate through the cavity as shown in Fig 17. In order to exclude birds and mice it is essential that the inner side of the grating should be covered either with fine-mesh rabbit wire, or expanded metal lathing.

Gable-springers formed by corbelling out in plain

tiles sufficiently to provide a neat stop to the projecting eaves are another suitable use in connection with brickwork—a plastered or rough-cast building may have such details more suitably formed in concrete or flagstones. This detail, as in the case of most others where trades overlap, wants careful watching. I have found a strong disposition on the part of workmen to allow the fascia to project in front of the corbel, which should, of course, stand far enough forward to stop both the fascia and the soffit. The most pleasant effect is produced when the oversailing takes place by increasing graduations, as shown in Fig. 18, and at such level as to attain its maximum projection in line with the bottom edge of the fascia. When the corbel jumps forward in a solid block, or in a series of even steps, it has a relatively clumsy look. A temporary strut below the overhang is desirable if the projection exceeds, say, 6 in.

The doorhead in a house which is intended to be purely of brick usually presents some difficulty—particularly when a recessed porch is desired. The way out is to form a flat arch of pantiles, with a keyblock either of stone or plain tiles. This forms

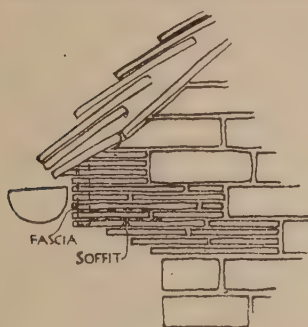


FIG. 18.

a naturally "joggled" arch, and is perfectly sound. Old hand-made pantiles should be used, and owing to both right and left hand being required they need to be cut so as to get rid of the nib and clipped angle. This can be done without much trouble by using an old worn-out back-

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saw, afterwards softening off the raw edges with a rasp. The skewbacks must be be hidden by projecting pilasters, and a brick and tile cornice completes quite a pleasant little practical joke. (See Fig. 19.)

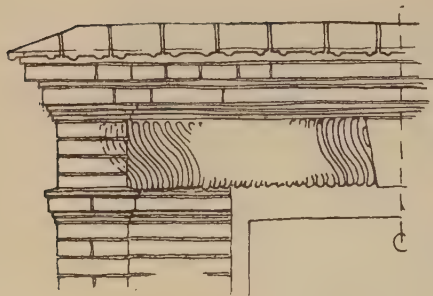


FIG. 19.

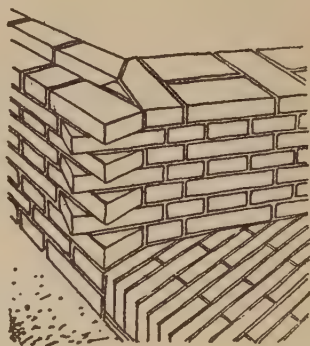


Fig. 19A.

Crossed Quoins. In connection with the formation of a recessed porch, which gains in its effect of welcome if its sides splay inwards so as to show a wider opening than the actual doorway on its inner plane, one is often faced with difficulty. The ordinary method of dealing with a splay angle is either "purpose-made" bricks, or cutting and rubbing. The former are troublesome to obtain, and the latter rarely looks well, either because the facing bricks in use do not cut well or special bricks introduced fail to blend. As with most difficulties, capital can be made out of a solution. If alternate courses are crossed with an angular pro-

jection, as shown in Fig. 19A, a pleasing effect is produced, and the expedient is quite practical. The bricks should be used frog down and the splay angle set out so that the hypotenuse of the projecting corners occupies the middle space of the brick above and below it.

The influence which the colour of jointing has on the effect of brick facings is a matter which it is hard to get workmen to recognize. "Colour" depends not solely on the material of the joints, but their proportionate width and recessing. It is hard to dogmatize, since facing bricks vary extensively, and demand varied treatment, but certain expedients infallibly have a deadening effect on the most interesting of bricks. One is a weathered joint of cement mortar of the ordinary dull, bluish-grey tinge; another is a white joint of narrow or medium width. This matter is really of extreme importance to the appearance of buildings, and worthy of much more consideration and experiment than it usually gets. A red brick of full size and naturally even colour probably looks best with thinnish flush mortar joints of soft brownish tone; strongly coloured bricks (such as the Black-country bricks) look well with fat white rough joints; grey bricks, such as Lutons or some Buckinghamshire varieties, look quite pleasing with joints raked or pressed in. While on the subject of jointing, it may be mentioned that even that execrable material—black mortar, composed of cement and smiths' ashes, has its use; a brick-on-edge wall so built makes an excellent backing for tile-hanging, which may be nailed into the breeze joints. These will hold the nails without breaking up, and the $4\frac{1}{2}$ in. rise of the courses gives a suitable gauge for vertical tiling.

Jointing.

Collar Roofs.

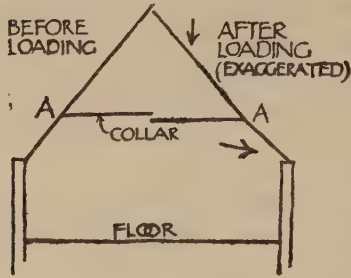


FIG. 20.

The collar roof, so often used in cottage design, has several notable structural weaknesses, which, though not fatal, are troublesome unless they are counteracted. One of these is that the tie afforded by the ceiling joists does not prevent the lower part

of the rafters from spreading; thus the laying of the tiling results almost invariably in a slight deflection about the point A (Fig. 20), with a consequent movement of the wall-plate—or possibly the inclination of the wall. It is desirable to counteract this tendency. At the gable ends this may be done by building in hoop-iron at the springing, as shown in Fig. 21, and carrying it back, say, 5 ft. into the gable wall, and wrapping the opposite end round the wall-plate and securing it by a spike or screw. Intermediately, every fourth rafter or so should be 1 in. thicker than the common rafters, and the collar housed in to that extent by a dove-tail housing. As an alternative, two rafters of the ordinary scantling may be used, with the collar clipped

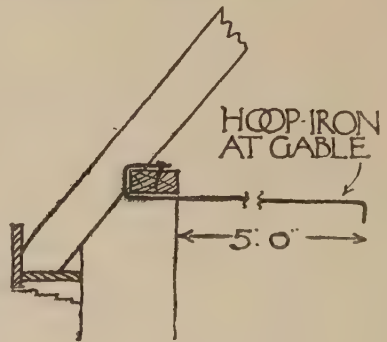


FIG. 21.

between them and the whole bolted together, as in Fig. 22. This latter method is a good one in all cases

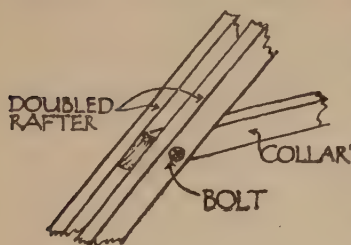


FIG. 22.

where the roof is trimmed for dormers, as one of the coupled rafters remains uncut.

For the further stiffening of collar roofs, a longitudinal runner suspended on hangers spiked to the ridge is useful, particularly if it is used in conjunction

with light purlins strutted therefrom. It should be noted that collar roofs are often over-timbered in the effort to stiffen their somewhat weak form. Much better results are obtained by an extra inch on the rafters than by heavy purlins. Even if the purlins stiffen the roof they add weight to the total to be borne by the rafter feet, and so often rob more than they confer.

Small valleys, such as dormer intersections, are much better without valley rafters. They should be treated merely by laying valley boards on the main slopes to receive the feet of the jack rafters, and supporting the feet of the main rafters on trimmers or beams across the opening, as shown on Fig. 43. This treatment eliminates the severe thrust of the valley rafters and avoids what is sometimes a very awkward feature in the interior, viz., a bit of timber to be wrought or cased breaking up the continuity of the plaster ceiling. **Valleys.**

Although a hip has less thrust than a valley, it is unwise in the case of a main roof of hipped form **Hips.**

to omit the old-fashioned dragon (or "dragging") tie (Fig. 23), even where this will necessarily show in the rooms. In the latter case the projection may be ceiled over below, and a plastered spandril formed above it. This provides a rather interesting feature, which is by no means unsightly, or combines very readily with a corner cupboard.

Gable Tilt.

I have found it helpful to specify that the end rafters next to the gables should be fixed 1 in. higher than the common rafters to assist in tilting up the tiling at the verge, and so prevent water from over-running the gables in times of heavy rain. This is

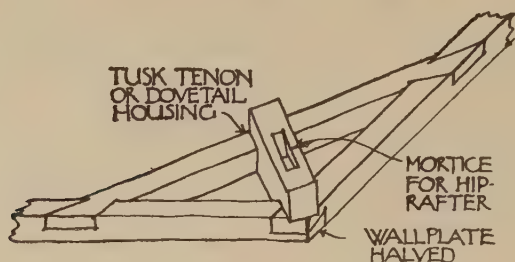


FIG. 23.

easily accomplished by reducing the notching of the end rafters over the plates and the purlins.

Slating.

In slated roofs it should be remembered that the topmost batten next to the ridge should be $\frac{1}{2}$ in. thicker than the remainder so that the under-ridge course of slates will bed properly and not "ride" (see Fig. 24). Tiles do not require this precaution, because they are assured of bedding well by the camber in their length, but slates, being straight, depend on the eaves' tilt for clearance, and the short under-ridge course loses this. Incidentally, for this reason, it is an

advantage if the slopes of a roof intended to be covered with slates have a slight sag or concavity;

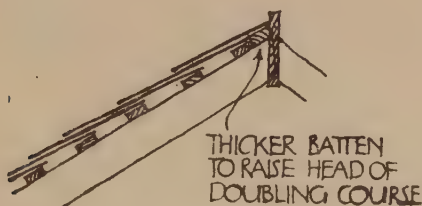


FIG. 24.

therefore, if the rafters are found to have a slight curvature when fixing, the *concave* side should be placed upwards.

The camber of the tiles, which makes it possible to ignore this point in tile roofing, also renders it quite easy to pass from one slope to another, as in a curb or mansard, where the slopes do not differ by more than, say, 15 deg. (see Fig. 25). Hundreds of old roofs in the Home Counties demonstrate this, but an unnecessary lead apron is often added in present-day work.

**Mansard
Roofs.**

In these days of easy transit, when material is as much a matter of choice in a building undertaking as the style and extent of the work, there is an ever-increasing danger of losing touch with the traditional methods practised by the old men, who formerly worked lifelong in perfecting methods of application for the materials ready to their hands.



FIG. 25.

Tiling.

Tiling has in this respect suffered grievously at the hands of the modern builder. It is now quite difficult to discover a man who can undertake the laying of tiles in other than a mechanical way; or, as the Building - Construction-Science-and-Art-Department - examination text-books usually put it, "the manner of laying is similar to slates."

The aim of the tiler in districts to which tiling is indigenous was to produce a watertight roof without falling back upon the use of lead, any introduction of which was evidently felt to be an admission of incompetence. Incidentally, the result produced always showed a sense of breadth and suavity, with complete freedom from the hard angles formed by the mechanical intersections of hips and valleys on the modern principle. What the tiler would have thought of finishing his valleys, as is sometimes now done, with an open lead gutter to which the tiles are cut on either side to a neat line, it is difficult to imagine. His method of working round a valley is shown by Fig. 26. The valley is first firmed up to an easy curve, sufficient to allow the battens when laid, with a natural sweep, to meet with a right angle in the plane of their upper faces. This sweep causes each course of tiles when laid to curve upwards as shown, against the actual valley course, which consists of a series of ordinary tile-and-half tiles (which are approximately square), laid "handed" right and left alternately up the valley. Their corners show as indicated by the direction of the shading lines. The system works best when the margin is about $3\frac{1}{4}$ in. The dotted tile-and-half "a" when laid would complete the topmost course shown of the roof-slope on the right of Fig. 26, and the next course to be laid on the left-hand slope would cover these, except for the corner immediately over the

valley. It will be seen that this valley is completed without the use of any special tiles, without cutting, and without lead. Staple Inn, Holborn, is a prominent

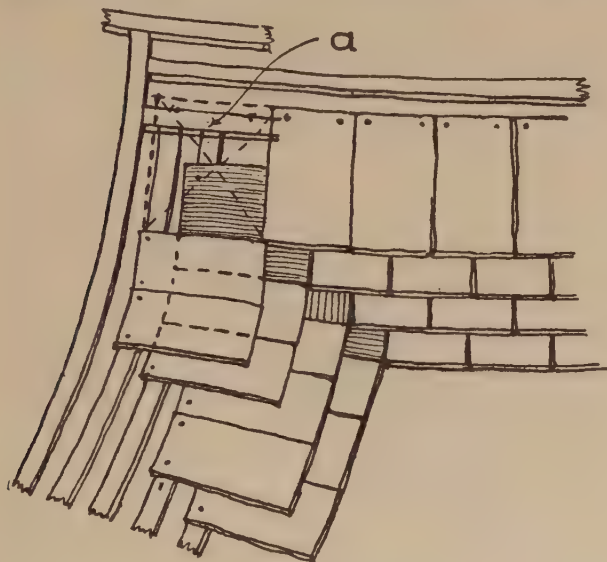


FIG. 26.

London example with valleys treated in this way, which, however, is exceedingly common all over the country, though seldom practised in modern work. The weatherproofing of hips and ridges is a matter of less importance than with valleys, since water does not run over them; only the rain actually falling on them being likely to percolate. The plain half-round ridge and round-ended hip tiles were practically universal before the last century, and it is at least gratifying to find most makers again manufacturing these patterns.

The intersection of dormers and other lower ridges with higher slopes affords another interesting example of the effort to exclude the plumber. The method is shown in Fig. 27. One length of common ridge-tile is inverted and bedded at the apex of the dormer ridge against the slope behind, forming a short cross-gutter to receive the water from above and direct it well out into the valleys on either side.

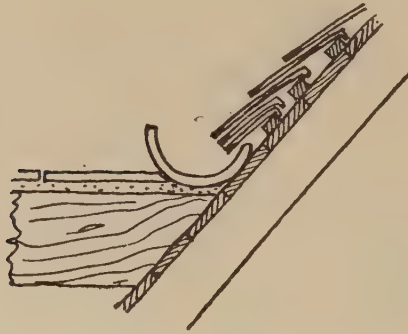


FIG. 27.

Underlining.

An economical underlining for tiles is greatly to be desired. I have tried felt laid directly on the rafters before battening, but it usually gets perforated and torn by workmen's feet, and in any case is liable to sag with the passage of years. If large-mesh wire netting is laid below it that is effective, but increases the cost owing to double labour. If underlining felt could be manufactured incorporating a wire mesh at a reasonable price I am convinced there would be a large demand for it, but I cannot tell whether this is an economic possibility.

CHAPTER 4

Eaves—gables and verges—ridges—eaves tilt—hipped or “bonneted” gables.

THERE is so much to be said about the treatment of eaves that it is hard to know where to start. First, as to the form of eaves; generally nothing looks so mean as open eaves, particularly with 3 in. by 2 in. or 4 in. by 2 in. rafters. In the case of 11 in. cavity-wall construction, there is an additional sound reason for close eaves—that is, the opportunity given by this form to build the upper part of the wall above the soffit board solid as shown in Fig. 28. This is invaluable, owing to the stability it gives the outer skin against external shock (as when a workman leans a ladder clumsily), and it ensures also that the whole of the

Eaves.

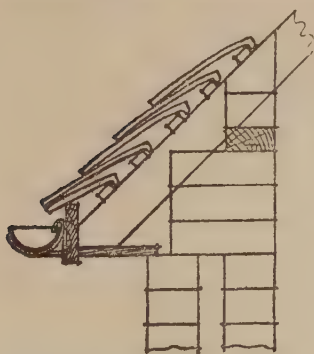


FIG. 28.

roof weight is not borne by the already over-worked inner skin. Proportion of eaves projection (apart from its protective function) is bound up with the question of pitch. In all cottage building, which will not usually exceed two stories, a tile roof of 45 degrees to 53 degrees pitch usually looks

LITTLE THINGS THAT MATTER

"fitting" with an eaves, as shown in Fig. 28, simply constructed with a 5 in. by 1 in. fascia raised so as to tilt the eaves course of tiling, and a 7 in. soffit board nailed through the fascia and to rafter feet. There is a tendency to over-do eaves tilt on small buildings, which do not usually need sprockets, tilting fillets, and such-like. A close eaves obviates the necessity for boarding under the projection of the roof, and greatly simplifies painting (and repainting !), while the gutter fixing is direct and easy. Guttering should be fixed as low down on the fascia board as it is convenient to go; provided it is true in line (with no dips) an almost nominal fall is sufficient. It is not lack of fall, but leaves and silt which cause gutters to overflow under ordinary conditions, and, in any case, it is impracticable to provide sufficient fall to render the gutters self-cleansing from such accumulations. A gutter fixed low, as shown, will permit a deluge of rain to shoot clear—which is better than catching it and dribbling it over the edge—and it is less liable to damage by falling snow. A simple thing which is often done in a very bungling manner is the discharge of water from the eaves of a hipped gable on to the lower roof slopes. One has seen a double returned gutter provided to get round the imaginary difficulty; also gutters with stop ends and nasty little down-pipes twisting on to the lower slopes like dead worms. If the gutter is merely prolonged so that the returns lie (with open ends) above the continued side slopes there is no need for anything more complicated. The water which will run off the hip corner is so little that it is negligible, but if from the situation of the hip it is in such a position that daylight would show through the gap, a 3 lb. lead soaker tucked in between the under eave tiles and resting

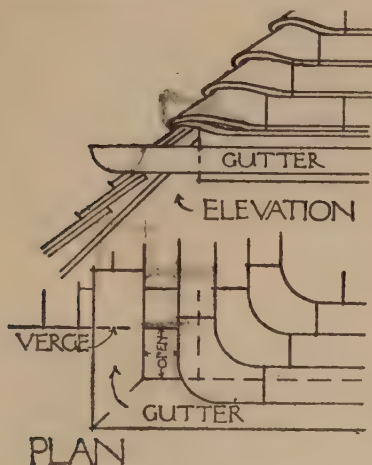


FIG. 29.

in the return of gutter will make all tight. This should be fixed after guttering, and need not be nailed. (See Fig. 29.) In the case of a slate roof of from 30 degrees to 40 degrees pitch a greater eaves projection seems natural, and there is stronger reason for an increased eaves tilt, since slates (unlike tiles) have no cam-

ber in length, and must be held up at the eaves so that courses above do not "ride." A projection of 12 in. up to 15 in. seems to give character to the simple hipped form of roof, which presents least difficulties in a slated building.

No form of verge is so satisfactory as the old one in which a tile undercloak is formed of plain tile bedded butt-joint on the wall beneath the roof tiling. This should project 3 in. from the wall face, and after laying the roof should be pointed up flush, but *not* plastered over the edges of the tiles. Gables often suffer from stalkiness due to an ape-like copying of the fire provisions of various building regulations (intended for parapets on party walls, and like cases). The effect of a gable parapet projecting 15 in. above the surface of the roof is much intensified at the apex, and ruins many a gabled front seen in perspective. The practical effect of such a gable moreover is to

Gables and Verges.

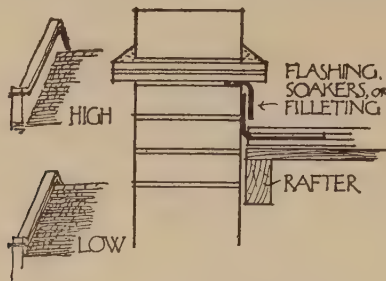


FIG. 30.

encourage dampness to soak down into the walls. No parapet which is not subject to fire regulations need stand above the roof surface by more than the amount necessary to allow the coverflashing or filleting to tuck in below the coping, or tile creasing. (See Fig. 30.) While on the subject of gables, how is it that in brick buildings recognition is seldom given to the fact that there is a natural gable pitch, viz., that of raked-back brickwork? This has often struck the writer when looking at gables containing diapered brickwork formed of dark-enders, and it is only necessary to see an old building where the rule is observed to be conscious of its sweet reasonableness.

Ridges.

There is, perhaps, little to be said on this subject except to rub it in that no ridge is so generally pleasing as the "half-round," and that it ought to be made a crime to put red ridges and hips on slate roofs. Buff or blue—or, if red alone is available, judicious use of blacklead or tar. A plea may also be made for the old method of packing up under the half-round ridge of pantiling with bits of broken tile in the channels—botching the considerable void up with mortar or cement looks, and is, most clumsy and unworkmanlike.

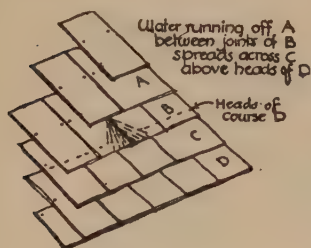


FIG. 31.

Reference has been made to the undesirability of exaggerating the eaves tilt. Several instances have come to my notice where melting snow-water has penetrated tile roofs owing to excessive flattening of the pitch at the very point

Eaves Tilt.

where the greatest amount of water is passing. It must not be forgotten that the rain water flowing down a roof is cumulative from ridge to eaves. Fig. 31 shows the manner in which water is able to penetrate a roof where the units of the covering are of insufficient *width* in relation to the pitch. It is the inability to adjust these factors in a tile roof (owing to the constant width of $6\frac{1}{2}$ in. to 7 in. of plain tiles) which makes it desirable that the pitch of plain tiling should be over 45 deg. Slates, of course, are not under this disability, and may be widened as the pitch flattens.

It sounds like a truism to say that building construction ought always to *look* rational. There is no more rational feature, when logically carried out, than that charmingly expressive piece of natural architecture, the Kentish or Sussex gable (Fig. 32). To the imaginative eye it tells its own tale; it can be seen that the roof is tied at the plate, that the rafters are supported twice intermediately by purlins—the lower in line with the ashlar of the attic or loft, and the upper at the ceiling-collar. Having been carried up sufficiently high to support the upper purlins, the wall stops, and the apex of the gable is hipped back. The window in the gable, with obvious

**Hipped or
"Bonneted"
Gables.**

LITTLE THINGS THAT MATTER

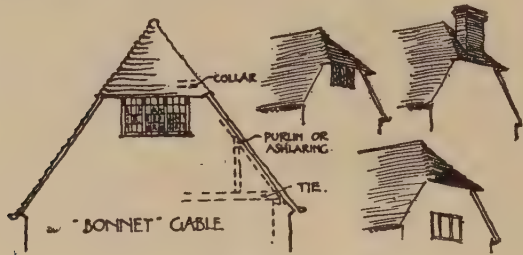


FIG. 32.

good sense, is placed as high as possible so as to give the maximum light and ventilation, and to secure shelter below the eaves. It is all perfectly sensible and straightforward. Far otherwise is it, however, when this bonneting is made a "feature," and, as often seen, is penetrated by a chimney-stack, or contains a window which appears to have slipped down to a position where it must break the roof tie.

CHAPTER 5

Pantiling—ridge—eaves—gable—flashings—hips.

NOT so many years ago the authors of **Pantiling.** building construction books were wont to dismiss pantiling—the chief and almost the sole roof covering in use in large tracts of England and in the Low Countries—with a few contemptuous words. It may be admitted that the pantile roofs carried out in the slums of London during the late eighteenth and early nineteenth centuries deserve harsh criticism; nevertheless, they have one manifest advantage—if they often leak, they are easy to repair. Still, pantiles laid in the manner customary to those districts where they have long been adopted for all but the most monumental buildings can provide a very satisfactory roof covering, and these methods of laying are worthy of investigation.

The ordinary pantile is a slab of burnt clay, about 10 in. wide by 14 in. long, formed to a wave section crossways, but straight from head to tail, and clipped at two diagonally opposite corners as shown in Fig. 33. A single nib is formed at the head, in line with the channel part of the wave section.

The gauge and spacing of the pantiling are practically fixed by the clipped angles, at 11 in. gauge and 8 in. side spacing, and any adjustment, apart from the variation brought about by other than normal

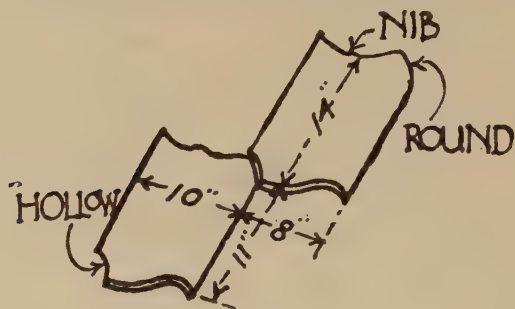


FIG. 33.

sized tiles, is possible within narrow limits only. Though good pantiles lie close, usually it is not safe to rely on the narrow margin of the head or the side lap alone to secure a watertight roof, nor are tiles merely laid dry likely to be steady under stress of weather. They are, therefore, either bedded (of which more anon), torched, or pointed; the object in each case being to prevent wind—and with it rain and snow—from penetrating between the edges of the tiles, and also to hold the latter firm so as to prevent stripping.

Torcing consists of pointing up all the joints in the roof covering from the underside after the tiles are laid. It has two obvious defects: its execution is hampered by roof timbers and battens so as to be less than perfect, while a slight movement of the roof causes considerable portions to loosen and drop out.

Pointing is a similar process applied to the outside surface of the roof. It can be done more completely, but it does not improve the appearance of the roof. It is apt to require renewal, and in time causes the

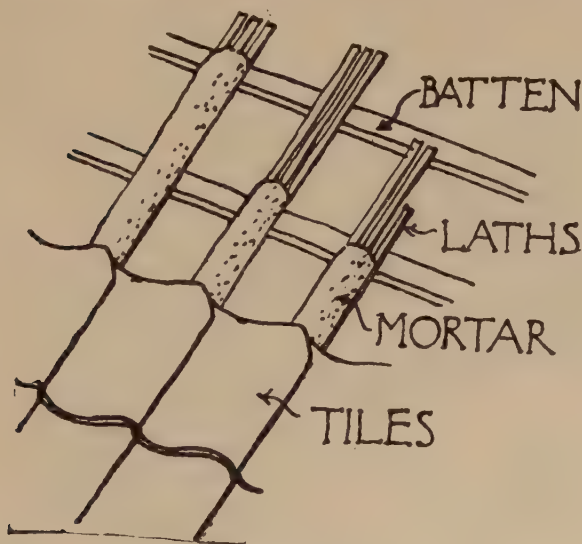


FIG. 34.

surface of the roof to appear to be constructed more of pointing material than of tile.

Bedding consists of settling each tile as laid on a mortar fillet running beneath the ridges formed by the side junctions of each row of tiles. Several methods may be adopted. By the "strip lath" method a triple row of rent laths is nailed above the tiling battens and running from eaves to ridge, to receive a mortar fillet below each joint as Fig. 34. This method uses the minimum quantity of bedding material, holds the mortar well, and has a neat and workmanlike appearance, but it lacks some of the advantages of "reeding and bedding." This latter method consists of filling in the spaces between the tile battens with a layer of reeds laid in the same direc-

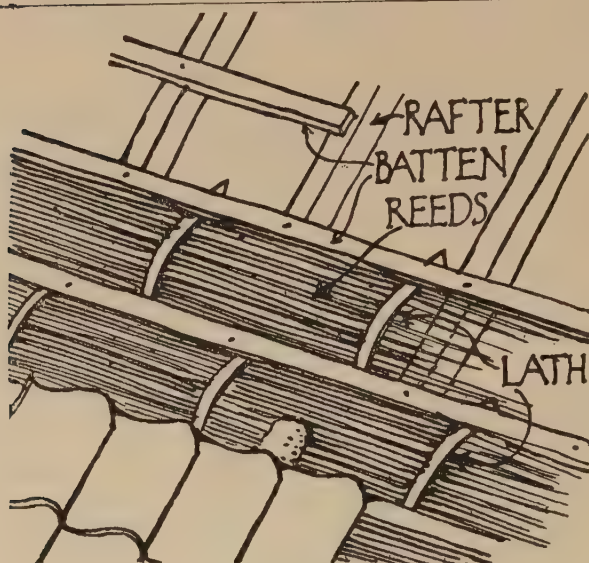


FIG. 35.

tion and held in position by short pieces of lath sprung in under the battens as Fig. 35. Upon this basis the mortar fillets are laid, and in old work it was often usual to plaster between the rafters on the underside of the reeds. Reeding has the threefold advantage of (1) acting as a sort of "blotting paper" to absorb any trifling moisture which may percolate through tiles or joints; (2) in the case of roofs liable to wind pressure from beneath (as in many farm buildings), protecting the tiling from stripping; and, (3) providing a valuable insulating layer against heat and cold.

The finish of the pantiling at the margins presents features differing from those of ordinary tiling or slating, owing to the curvature in cross section of the tiles.

When a half-round ridge tile is placed over the pantiles a considerable space is left above the furrow part of the tiles, and this requires filling. In good old work the space was always packed up with pieces of broken tile in mortar, or neatly filled with strips of plain tile as Fig. 36, which gives a very attractive and craftsmanlike finish. If the 11 in. gauge of the tiling did not quite suit the length of roof slope it was sometimes customary to make up the difference with one course of plain tiles above this packing and immediately below the ridge. In modern practice the space under the ridging is more often clumsily daubed with cement.

Ridge.

At the eaves the soundest work is produced by laying an under-eaves course of slates or plain tiles (out of sight) on which the tiles of the bottom course of pantiles should be bedded in mortar, Fig. 37, or a brick corbel-course, as Fig. 38.

Eaves.

Owing to the fact that pantiles are commonly made right-handed, a gable will show a different edge on the two opposing slopes. Many old roofs were terminated at the gables by a low parapet of brick on edge, either $4\frac{1}{2}$ in. or 9 in. wide, and rising just suffi-

Gable.

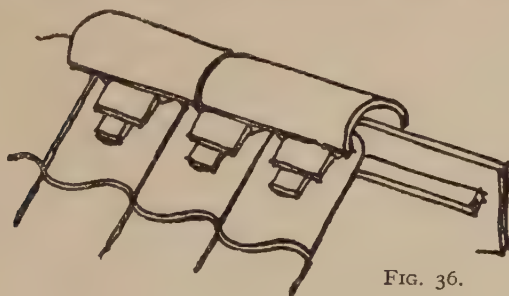


FIG. 36.

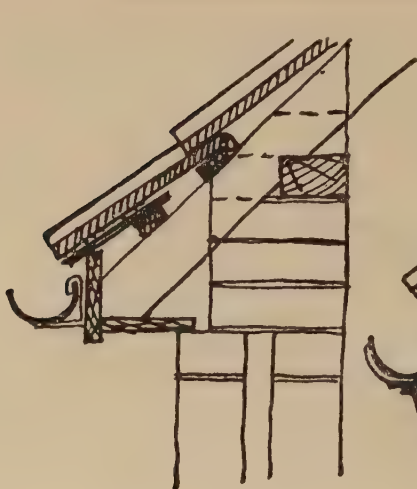


FIG. 37.

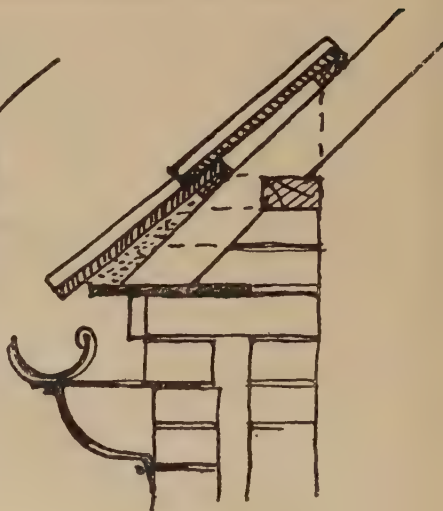


FIG. 38.

ciently to back up a cement fillet on the tiles, Fig. 39. This gives a finish full of character, but the parapets are apt to provide a ready means of ingress for damp. The ordinary tile verge with undercloak is not a very happy treatment for pantiling, and if a gable form arises the finish most common in East Anglia is practically the best that can be devised. It is shown in Fig. 40. The capping above the barge board holds down the exposed verge, the place where stripping usually begins.

Flashings.

Any of the ordinary types of cover flashing may be used with pantiles, though an apron flashing requires extensive labour in dressing it to the corrugations of roof. Soakers cannot be applied to a pantile roof. The use of leadwork in connection with pantiling is inclined to savour of patching a fustian garment with satin. The head and side joints with which the roof

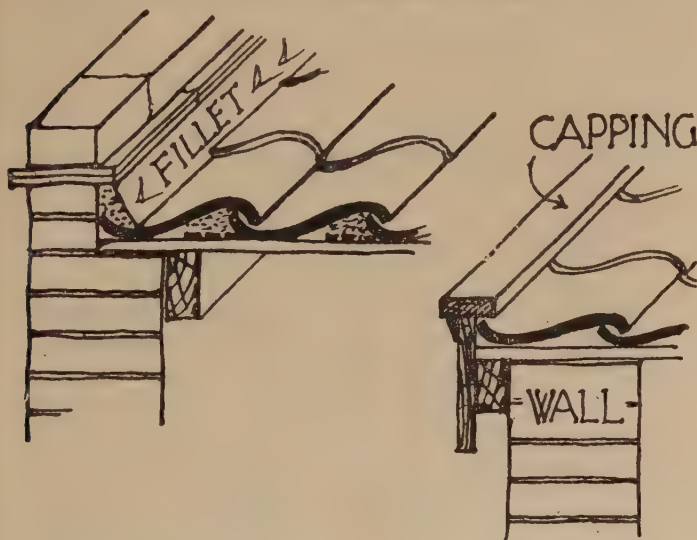


FIG. 39.

FIG. 40.

is intersected depend on mortar pointing or fillets, and one such joint more or less can make little difference.

Hips can only be covered with half-round ridging, **Hips.** beneath which the same problem as at the ridges must be dealt with. Intersections in old work were often formed by a course of pantiling laid down the valley, over which the tiling of the intersecting slopes was cut and bedded. This looks much better than an open metal valley, but it must be admitted that most of those which have been seen appear to have given trouble at some time or other. This covering is not really well adapted to a roof with many intersections, but to a bold and simple form free from complications and used under these limitations pantiling gives quite good results.

CHAPTER 6

Chimneys — dormers — bargeboards — weatherboards —
weathertiling—vent flues—party walls.

Placing of Chimneys.

NOTHING shows so conclusively the careless or incompetent architect as the haphazard appearance of chimneys in isolated or inconvenient positions in the roof. There are, of course, places where chimneys should never be allowed to break through—such as in a hip or a valley, both for appearance sake and for the weakening effect on roof structure. Chimneys which poke up through a roof slope intermediately between the eaves and the ridge also usually have a forlorn and unconsidered air.

What may be called the legitimate positions are ridge, gable, and eaves, and each has its points. The ridge is, of course, the most sensible position, since chimneys then have their greatest proportion kept dry, they stiffen the roof, and are less interfered with by vagaries of air currents. They also require less flashing and no gutters, but they *do* require a damp-course just above roof level, and particularly so if there are rooms in the roof. In that case the distance between the points where the chimney is exposed to driving rain and open to the room respectively may be a few feet only. Offset courses or projecting weatherings just above the roof slope are also useful.

If a chimney cannot be schemed so as to centre with the ridge a position beside the ridge is good. Such a

chimney gains importance in appearance (from one side), and there are probably fewer constructive difficulties in this position than in any other, as the ridge is uninterrupted. A gable chimney well treated always looks fitting in a stone-built house where the walls are thick and the gable coped, but it does not look well as a rule in a brick house unless it is boldly projected and defined right down to the ground; otherwise there is bound to be awkwardness and indecision as to the verge stop. This is even more true in the case of a chimney at the eaves. If it merely sticks up accidentally from the eaves level it looks either mean if it is low and stalky, or dangerous if high. Such a chimney needs to be specially sturdy and vigorous in design to satisfy the æsthetic conscience that it is not liable to be pushed over by the roof. It should project sufficiently far to make its emphasis a definite winner in the struggle with the eaves, and it should be united to the roof slope behind by a minor pitch-roof intersecting therewith, for which we appear to have no definite name, but which America knows as a "cricket" (Fig. 41).

The present tendency is undoubtedly towards the elimination of the chimney. Its absence or reduction gives a curious and unfamiliar look which custom

Chimneys.

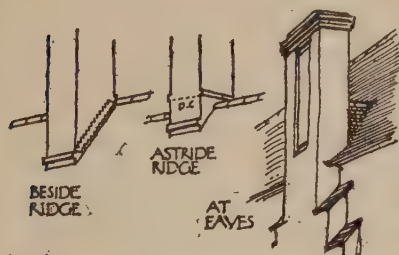


FIG. 41.

will presumably remove. While chimneys continue to be built, however, do let us make them robust, and not (as many are) sickly and dying. No stack less than 1 ft. 10½ in.

on its narrowest face deserves to live, and where it is not possible to obtain this width by grouping flues it is worth while to thicken or corbel out $4\frac{1}{2}$ in. just below the roof to achieve it. This will give a chimney with a 9 in. wall on one (or two) faces, and $4\frac{1}{2}$ in. on the remainder; practical advantage of this should be taken by disposing the extra thickness towards the rainy south-west. The amount of projection of over-sailing chimney caps—as

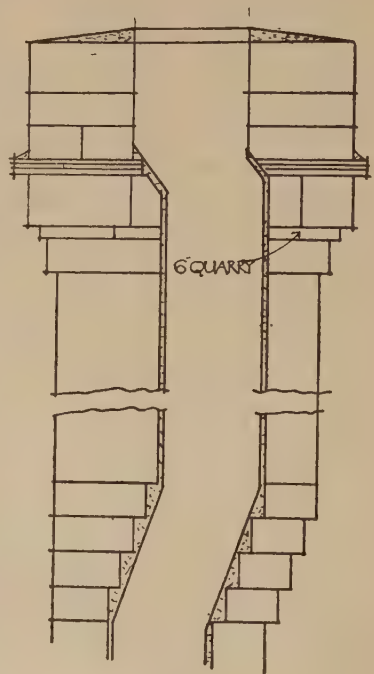


FIG. 42.

well as of over-sailings generally—is usually much too great. Nothing coarsens scale so effectively as the clumsy $2\frac{1}{4}$ in. “corbel courses.” A projection of $\frac{3}{4}$ in. is often sufficient (remember that on a chimney cap it is the angular view that counts), and $1\frac{1}{8}$ in. is almost the maximum that looks well. The judicious introduction of a course or two of plain tiles, 2 in. paving bricks, or 1 in. quarries will relieve the monotony of repeated offsets. (See Fig. 42.) If it is desired to terminate the flues with pots, probably nothing looks better than a 9 in. agricultural drain pipe built in so

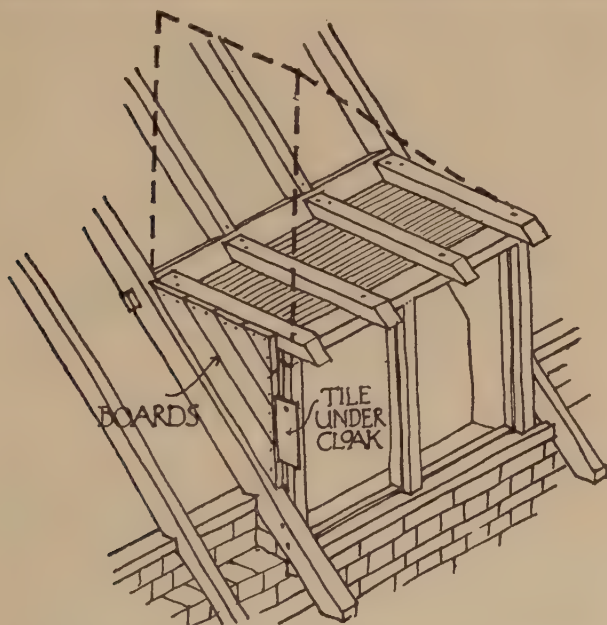


FIG. 43.

as to stand up about 2 in. above the cement flashing. This can be lodged on the internal offset shown in Fig. 42 (where, however, no pot is shown). Most modern pots are detestably ugly—notably the one called “cannon-end”—and even a taper pot is usually so much exaggerated as to taper that it is better avoided; yet there are acres of good old chimney-pots to be seen in old parts of most towns.

A great deal of bungling and round-about methods are often displayed in the treatment of dormer cheeks. This usually leads to a thick cheek, which calls for a cover slip, leadwork, or some ungainly addition to what is properly a very simple thing. Fig. 43 shows a simple and satisfactory treatment of a

Dormers.

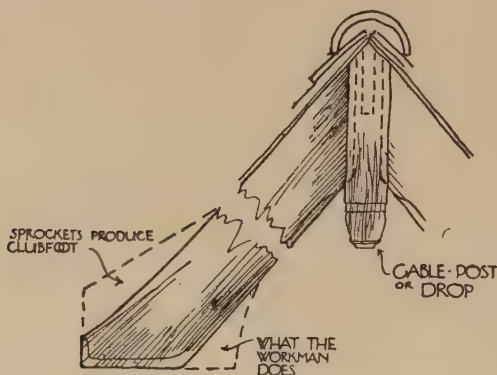


FIG. 44.

small dormer. The trimming rafters are fixed close up to the window frame, which is stayed back to the trimmer by shallow ceiling joists. The dormer roof is tied sideways by collars. The actual cheeks are formed by grooved and tongued boarding running parallel to the roof pitch, and nailed from side head to frame, without studs. This boarding stops short of the groove on the back of the frame, so as to allow a tile undercloak to be fixed as shown. The groove on the frame intercepts any slight leakage, and conducts it down to the oak cill, whence it weeps out. Internally the diagonal boarding is counterlathed, and plastered out. It is not too easy to describe, but very easy and natural to do. Lead soakers are laid in with the roof tiling, turned up against the boarding, and covered by the tile-hanging on cheeks, which is nailed to the boards without battens. The hip roof is omitted in the diagram, its general outline being shown by dotted lines.

If it is placed truly in relation to the frame and cheeks before tile-hanging, a wider eaves-soffit will

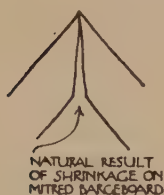


FIG. 45.

eventually show on the front, which looks very well. No fascia need be given to the dormer eaves, and the boarded soffit if fixed when tile-hanging is completed will serve to secure the top course of tiles.

Bargeboards.

The bargeboard suffers from excesses committed in a previous age, and is a discredited feature. It is, nevertheless, often a sensible and serviceable thing to use—as, for instance, in conjunction with weather-boarded or tile-hung gables. In both of these cases it is difficult to make a workmanlike finish against the verge, and in the case of weatherboarded gables it is highly desirable to arrange cover (such as the bargeboard affords) for the scribed ends of the boards. These always show open joints from shrinkage if not so covered. The points about bargeboard design to be remembered are: (1) that the foot is likely to be quite sufficiently clumsy if the eaves are carried out in the simplest and most direct way without expanding the bargeboard unnecessarily downwards (which workmen love to do!), and that when considerable sprockets occur at the eaves of a roof the bargeboard ceases to be manageable. See Fig. 44. (2) The purpose of a gable-post (always introduced in the best periods of carpentry) was not the provision of a spike on the apex. With the fashion for spikes the gable-post has often dropped out too; it is, in fact, a practical and workmanlike expedient for jointing bargeboards and ridge. Think of any other way in which this joint can be made, and the fact will be apparent (Fig. 45).

Elm weatherboarding has come into greater prominence during the shortage period succeeding the war.

Weatherboards.

Its appearance is pleasant, but its use is full of pitfalls. The well-known property of this timber—endwise shrinkage—is its most awkward characteristic, but its great twisting force is also difficult to restrain. From a considerable experience of its use I would say (1) always use the waneyedge boarding, but start from the bottom with a straight-edged board; (2) use nothing less than $\frac{3}{4}$ in. thick—1 in. is better; (3) if the weather is to be excluded lap the joints at least 3 in. (to allow for shrinkage) and underline; (4) nail with 4 in. wrought flat-headed nails; (5) fix as soon as possible after sawing up—before the boarding has a chance to twist; (6) obtain boards in long enough lengths to cover from corner to corner or opening to opening without end joints. A butt joint occurring on a stud provides insufficient space for nailing—the nails close to the ends tear or break loose as the boards shrink and twist. The nailholes close to the ends of boards should be made with a twist drill ready for the nails to be driven in. Featheredge elm boards are not a success.

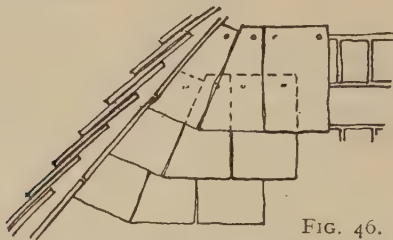


FIG. 46.

Weather-tiling. Where tile-hanging runs out against a gable there is always difficulty in fixing the triangular pieces of tile next below the verge. The old way of overcoming this is seldom tried, but cannot be improved on. In each course the *two* end tiles are cut fan-shaped instead of one only being triangular; by this means

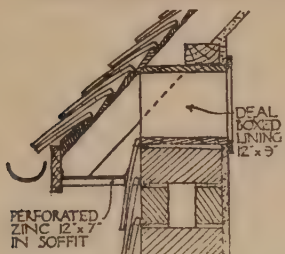


FIG. 46A.

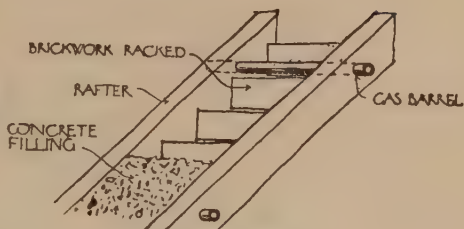


FIG. 47.

each will preserve a nail hole, and fixing is easy, while the upward kick at the end of each course line is very pleasant in effect (Fig. 46).

It is difficult to interrupt weather-tiling to admit the by-law ventilator required in chimneyless rooms, but this trouble may be circumvented by forming the wall flue between the level of eaves-soffit and wall-plate, and the external grating in the soffit board (Fig. 46A). This method is applicable in other circumstances also, and is both practical and unobtrusive.

Vent Flues.

Since the fortunate abrogation of the model by-law calling for parapets to penetrate roofs, it is a common sight to see the brickwork of party walls apparently bursting up through tiles or slating at this point owing to shrinkage of rafters, purlins, etc. This effect can be minimized by the use of $\frac{1}{2}$ in. gas barrel dowel-corbels to support and connect the rafters on either side of the wall as shown in Fig. 47. The brickwork is roughly racked back to a line between the rafters, which are drilled with a $\frac{3}{4}$ in. bit at about 4 ft. centres, and threaded with 14 in. lengths of barrel. The intervening space is then packed solid to line of boards or battens with fine concrete, upon which tiles or slates are bedded where crossing the wall. This reduces the effects of shrinkage to a gentle swelling rather than a sudden hump.

Party Walls.

CHAPTER 7

Sash frames—casement hanging—doors—weatherboards.

Sash Frames.

ALL surveyors who have prepared schedules of dilapidations are familiar with the unfailing decay which attacks the outside lining of a sash-frame at the point of juncture with the oak cill, due chiefly to the water-holding formation at this point. The checking back of the lining to the face of the pulley stile, as in Fig. 48, counteracts this tendency.

Casement Hanging.

In wood casements an unsightly dent usually soon arises on the closing side of the frames and mullions, due to the cockspur fastener fouling the edge. This may be overcome by fixing at this point an extra slot-plate recessed in the frame, level with the outside edge, and at the same time the advantage is cheaply secured of a two-point closing, with slight ventilation when required. Similarly the fixing of two pins with proper knuckle-jointed casement stays provides a supplementary window fastening,

and is well worth the penny or so involved. It is often difficult to arrange an uneven number of lights on an upper floor so that the exterior can be cleaned without the use of ladders. If the odd light be hung on parliament (or shutter) butts

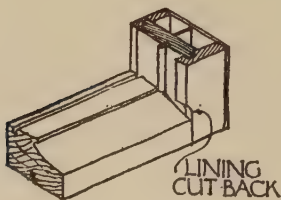


FIG. 48.

made for hanging outside shutters folding into a $4\frac{1}{2}$ in. brick reveal, the casement will throw clear of the hanging side when opened, leaving a gap through which the hand and the arm may be passed for cleaning. (See Fig. 49.)

Provision for curtains often creates a nasty problem to the owner after the builder has left, particularly the inner curtains, which most people want during the winter months. A concrete lintel does not take kindly to attempts at attachment. These needs are met when the window-heads are arranged at such a level that the picture-rail carries over. Incidentally the apparent scale and restfulness of any room is greatly enhanced when the wall surface is definitely conceived in bands with as little interruption as possible, and the space above the door and window-heads, which is the most important of all, should not be broken into unless it is unavoidable. Where wood lintels are used internally (and for cheapness and simplicity over moderate spans they have no rivals), a good method is to fix them flush with the brickwork and cover them with a wrot fascia and soffit as shown. This method provides ample fixing as well as slight latitude for the adjustment of the picture-rail. I know of nothing to beat a plain flat or slightly moulded flat picture-rail about $2\frac{1}{2}$ in. deep, which appears less as a strip on the wall than as a capping to the filling, so

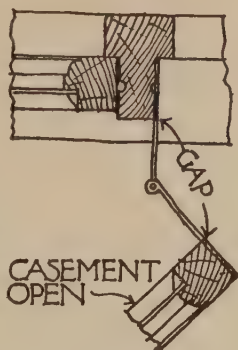


FIG. 49.

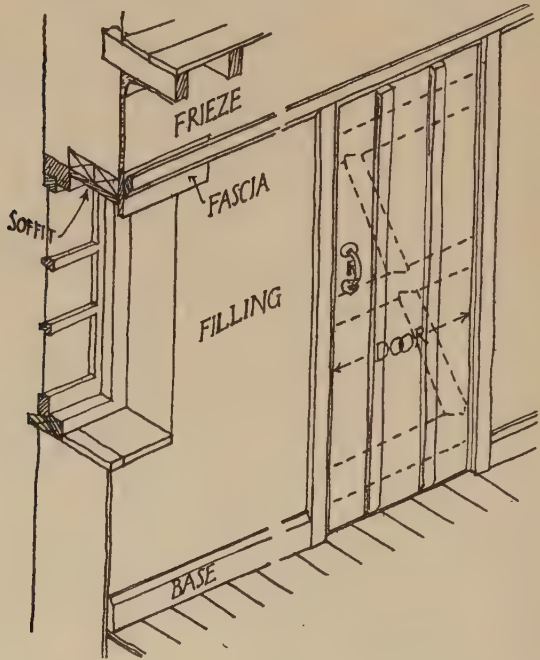


FIG. 50.

that the wall becomes base, filling (with cap), and frieze (Fig. 50).

Doors.

There is nothing new to be said about panelled doors, and (to be Irish) what there is new about ledged doors is old—but forgotten. First, as to bracing: a much stiffer and more sightly door is produced by bracing straight through than by what may be called zigzag. The latter looks particularly bad when the ledges are unevenly spaced, and the braces, therefore, not parallel. An alternative is to omit braces but introduce two extra ledges intermediately and screw (instead of nail) the middle and



FIG. 51.

end boards to each ledge. A very pleasant old-fashioned ledged door was made up of boards differing alternately in width and thickness, the thicker boards being rebated and delicately moulded to cover the wider thinner ones (Fig. 51). The hanging of ledged doors to linings with architraves is not so easy as it looks, unless it is convenient to have the door "inside out" and fix the strap-hinges or cross-garnets on the opposite side to the ledges. If hung on the other (and normal) side, either (1) the hinges are screwed along the ledges and the door when open presents a gaping slit on the hanging side; or (2), if screwed to the boarding, as soon as the door is opened square the ledges foul the architrave, unless they are either chamfered off at the ends to a considerable angle or stopped an inch or so short of the edge. Neglect of one or other of these precautions soon results in the door being wrenched off the hinges.

Two further small points as to doors are : (1) don't fix linings in breeze or similar slab partitions; use solid frames with the posts carried up as horns to a secure fixing at the floor or ceiling above; (2) an oak or elm slip $\frac{1}{2}$ in. thick, as wide as combined thickness of door and door-stop, and rounded on the edges, is a good thing to raise doors over a carpet and exclude consequent draughts as well as often serving to cover the joint between, say, tiles and wood flooring. A satisfactory junction is not made easily, as the edge-line of the quarries is rarely absolutely true, and the

wood floor will most likely shrink away so as to leave a more or less open crack. If, however, the joint is covered with a $\frac{1}{2}$ in. oak threshold of the same width as the thickness of the door plus its stop, fully rounded on both edges, screwed to the wood floor, and lapped over the tiles as Fig. 52, it enables the door to fit close at the bottom, and still pass a carpet or mat.

Weatherboards. One of the most ineffective things in use is the weathermold or board, as commonly applied to external doors. Only too often it delivers the water which runs down the door just where it is not wanted—on a projecting step level with the floor, ready to be blown under the door, as it is. After this has happened until it cannot be tolerated longer, a water-bar probably is inserted in a groove cut in the step, and over this the occupants trip in moments of forgetfulness.

The important thing to rectify is the relation of the step or threshold to the weatherboard. Fig. 53 gives a satisfactory arrangement for a brick step which is flush with the floor, and Fig. 54 shows a frame with an oak threshold raised to clear a doormat. It is noteworthy that few people will trip over a substantial threshold, though many fail to notice an independent water-bar. Incidentally I much prefer a raised threshold to a mat sinking, which is a nasty dirt-trap.

Fig. 55 shows the construction of a cill of a French casement which is made to open outwards (as, of course, no properly "French" casement

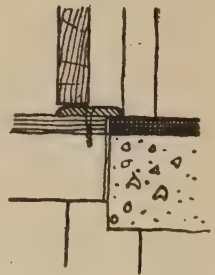


FIG. 52.



FIG. 53.

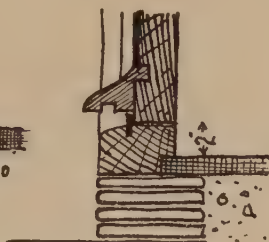


FIG. 54.

would do), as in the case of a room opening on a loggia. I have found this arrangement reasonably draught-proof. A good way of fastening is by an espagnolette bolt, fixed to the last-closed of the pair of rebated doors, wedging over the weather-bar. Trouble will be saved if the bolt is actuated by a lever handle having an up-and-down motion; the ordinary oval turning-handle is apt to jamb the fingers of an incautious user against the opposite half of the door.

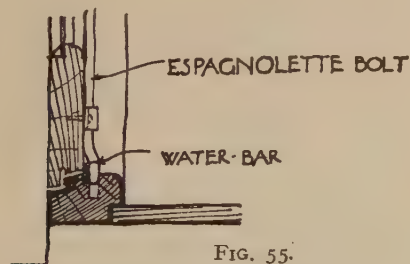


FIG. 55.

CHAPTER 8

Stairs — shelves — fireplaces — peat fires — dog grates, hob grates, and smoky chimneys — gas flues.

Stairs.

A BUILDER, unless otherwise instructed, seems always to paint stair margins. When treated in this way the stair margins quickly become shabby, and a better way is to stain them with a creosote stain. A method of treating old worn stairs, which looks excellent and is very practical, is to fit new oak nosings standing about $\frac{1}{4}$ in. above the old treads, and fill up with plain lino fitted separately to each tread. A very useful provision is a stairhead table, which can be contrived at the balustrade level over the return flight below, without any sacrifice of space. The usual "close thing" in stair trimming may be made still closer

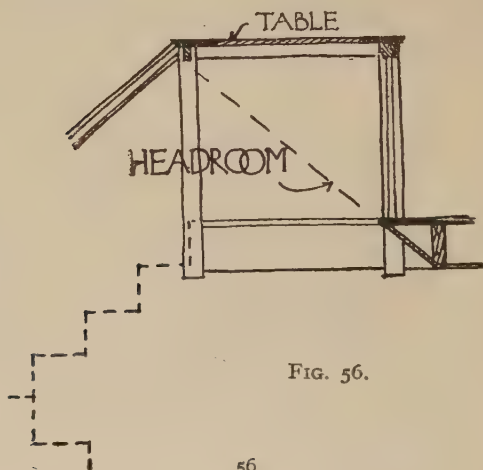


FIG. 56.

by keeping back the joist, and bracing the projecting floor-boards and nosing by a raking lining. (See Fig. 56.)

It is a good practice to fix the larder and similar **Shelves.** shelves with a 1 in. space between their back edges and the walls. This is most easily done by fixing continuous vertical grounds 3 in. by 1 in., to which the shelf brackets are screwed. This 1 in. space prevents the accumulation of dirt, improves air circulation, and permits the shelves to be cleaned without smearing the walls.

A good deal has been written lately of the saving **Fireplaces.** in space gained by the general adoption of gas fires. Every one cannot have gas, however, but space can often be saved in minor fireplaces by avoiding undue depth of reveal and needless width. It is quite possible to get such a fireplace into the through depth of a 9 in. flue, viz., 18 in., by making the reveal only 9 in. in depth. The chief point to remember is that the flue must sometimes be swept, so that the 9 in. back to the fire opening must weather off below the head. So that this aperture may not be too glaringly visible it is advisable that it be kept low—1 ft. 9 in. is ample (Fig. 57). To

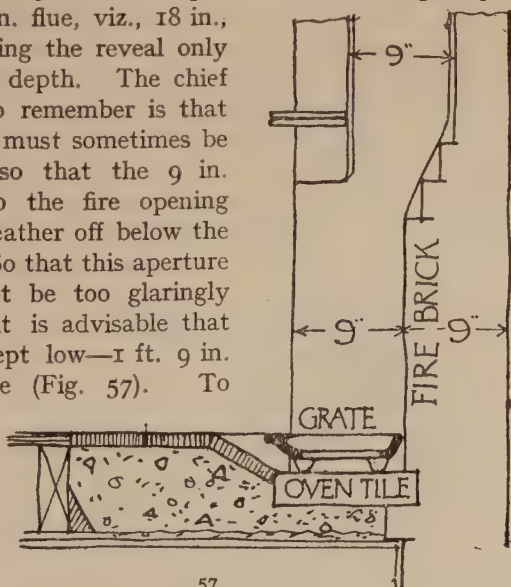


FIG. 57.

ensure a good draught every chimney should have at least one cripple; a simple rule to ensure that no contraction takes place at this vital point is a two-course difference between the gathering point at the opposite sides of each bend (Fig. 58).

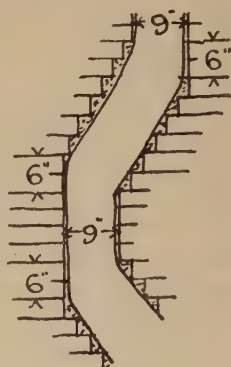


FIG. 58.

The effective size of a small room is much increased if a kerb or fender can be entirely dispensed with. A hearth type of grate-bottom set level with the floor in a splayed sinking achieves this with perfect safety (Figs. 57 and 59).

In no detail of the humble domestic interior, which yet aspires to be something rather more than a cottage, is the opportunity for a distinctive treatment more constantly neglected than in the fireside, and that notwithstanding the great improvement which has taken place in the quality of the design of the central feature—the grate—which is now commercially obtainable in many simple and agreeable forms. This neglect is particularly the case with regard to

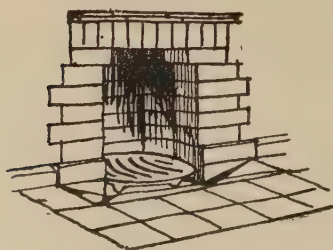


FIG. 59.

those chimney openings—the most common—having projecting breasts. A great addition to the "character" of the room is made when the chimneypiece treatment is spread over the whole of the

face and returns of the projection, rather than as a blotch on the centre only. The broadening effect of a suitably designed chimneypiece on the lines of Fig. 60 on the apparent scale of an apartment, as contrasted with the minimizing effect of the commonplace "mantel," is very great. Such a chimneypiece can be made up quite cheaply by the joiners from permutations of the architrave, picture rail, and other mouldings—the long deep panel over the shelf being plaster, on the wall surface. The protection of the salient angles of the breast by the panelled return is alone worth achieving, for this point above all others seems most subject to damage from careless movement of furniture.

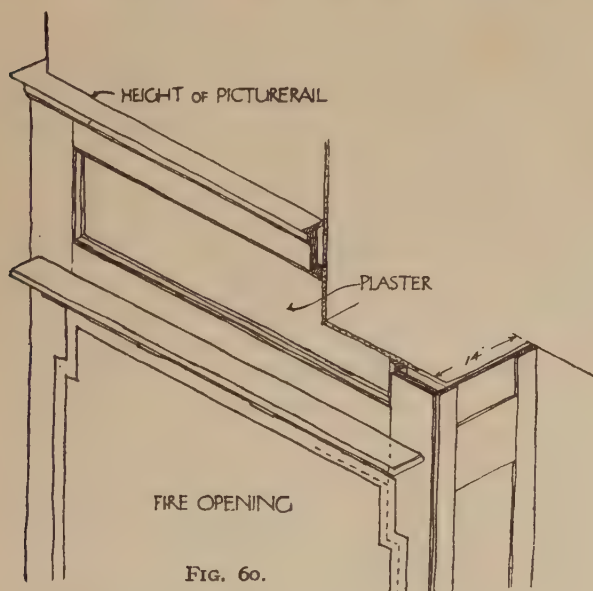


FIG. 60.

Peat Fires.

Mr. Harold G. Leask, assistant architect in the office of Public Works, Ireland, has contributed some useful hints with regard to the construction of fire-places for burning wood or turf placed upon a low hearth in a simple opening, which is a common problem with architects working in rural Ireland. The sketch section, Fig. 61, shows a construction which has been found to work very satisfactorily, and a comparison of it with Fig. 57 will be useful.

The main points to which attention must be given to ensure good draught and freedom from smoke trouble are as follows, and are embodied in the sketch:—

1. A minimum width to soffit of lintel, which, if made wide, causes smoke to come out. (Arches are not satisfactory as a rule.)

2. A contraction of the opening from fire ope to flue at some little distance *above* the soffit level of lintel, which helps to intensify the draught at this important point.

3. A forward slope to the fire-back to ensure quick heating of this surface, which alone when warm serves as a good conductor to smoke.

4. A horizontal "baffle," above the contracted opening or throat already referred to, which will "eddy" any blowdown. A slope in this position is usually fatal. In the case of a coal fire, the horizontal baffle would provide a lodgment for soot, which would then be liable to puff into the room at unexpected times when no fire was burning.

5. An easy gathering also beginning *above* soffit level of lintel. A quick gathering from soffit level usually causes smoke to come out into the room at the top of the jambs.

Wide soffits, straight fire-backs, and gatherings either too quick or cavernous have in numerous cases

FOR THOSE WHO BUILD

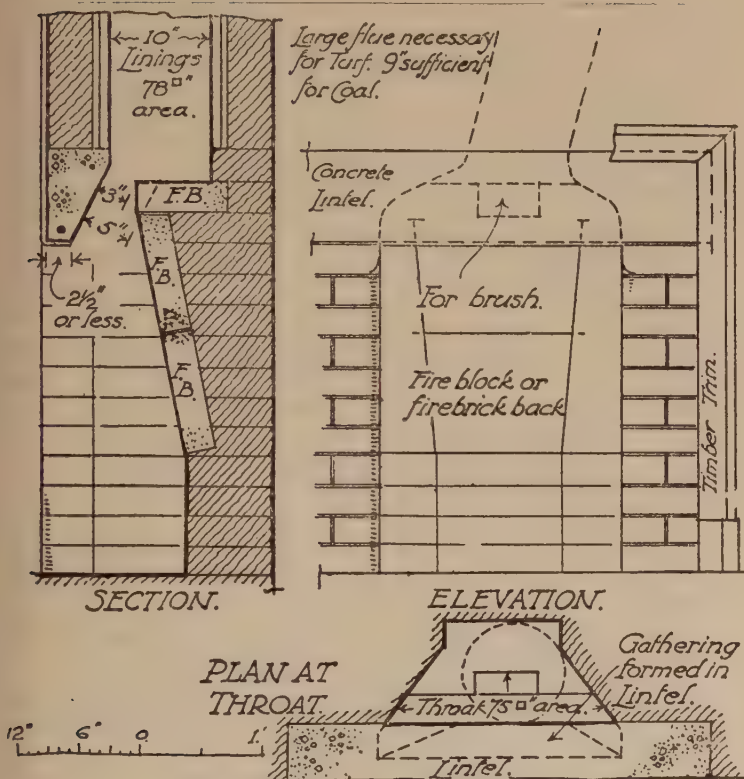


FIG. 61.

resulted in smoky and sluggish fires, and have been cured by treatment upon the lines described above.

It is sometimes necessary to fix grates of one or other of these types,* which although not conforming to the most approved modern principles in efficiency, are desired for their intrinsic beauty. In such cases that horror, the smoky chimney, is greatly to be feared; the cause being not so much "down-draught" in the generally accepted sense, but lack

**Dog Grates,*
Hob Grates,
and Smoky
Chimneys.**

of quick definition in the initial momentum of the ascending hot air immediately above the fire. If a vertical chase, $4\frac{1}{2}$ in. deep, and, say, 14 in. wide, is formed from the level of the fire-back well into the gathering of the flue, the chance of a good draught will be greatly increased. I have cured existing smoky chimneys merely by forming such a chase by building up the angles of the opening from the hob level. (See Fig. 62.)



FIG. 62.

Gas Flues.

Though it has become the custom to treat flues from gas-fires with a freedom amounting to license, terminating them by an airbrick at any chosen point (as, under the eaves), or merely discharging into wall cavities; it is desirable to carry them up at least as high as the main ridge so as to be clear of downdraught. I have found it convenient to lead them to the middle position in the stack, arranging them back to back in the thickness of the chimney, building the cap over solid, with a tile or terra-cotta airbrick on each face below, stopping the withe at this level so as to get a draught through. (Fig. 62A.)

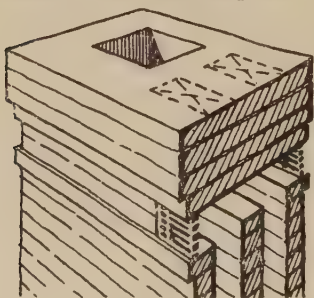


FIG. 62A.

CHAPTER 9

Drains—sink taps—bibcocks—draining boards—sanitary fittings—gas-service—rainwater pipes—soil pipes—bath wastes—overflow—hot-water system—warning pipes.

IT is surprising how often the obvious essentials **Drains.** of drain construction are missed in practice, and money wasted by thoughtless use of material and labour. In laying stoneware pipes upon concrete, three methods are available for making the cement joint all round the collars. By the first, the barrel of each pipe is supported on bricks laid flat on the concrete, which is supposed to be filled in around and below the pipes after jointing. This is a risky method, likely to provide unsound bedding and lead to fractured joints or collars in filling in the trench. By the second, a pocket for each collar is cut in the concrete after laying, and after jointing the pipes this is filled in with fine concrete. This method allows the barrel of each pipe to bear continuously on the concrete, taking all weight off the collars and is quite satisfactory but expensive. By the third method, when the concrete is being laid, a series of bricks are bedded flat at 2 ft. intervals corresponding with the spacing of the drain collars, sunk 2 in. in the concrete, and standing up 1 in. above its surface, which enables them to be withdrawn as soon as the concrete begins to set, leaving a series of pockets ready formed. This method has all the advantages of the last, and is considerably easier in practice.

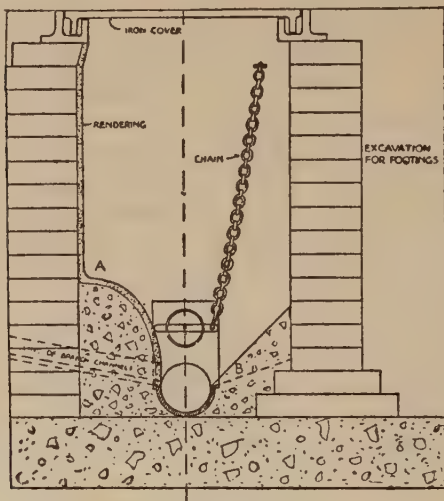


FIG. 63.

Manholes are often constructed with little thought for the conditions under which they are used. First, as to the structure; under any ordinary conditions footings to a manhole are quite unnecessary. Their purpose being to spread a weight over a large bearing area, manholes (which carry their own weight only) do not require them. In a manhole 3 ft. by 2 ft. 3 in. (the common internal size) the omission of footings saves more than half the quantity of excavation. In forming the benchings two objects must be attained. Since the purpose of a manhole is for inspection and clearing of branch drains, a suitable foothold must be provided for workmen who have to descend with that object. This may, of course, be effected by forming very flat benchings as shown in Fig. 63 by the dotted line at B, but reference will show that any discharge from branch channels opposite is almost

certain to deposit a portion of its solids on the benching, which in a short time becomes very foul. This may be partially rectified by steepening the slope as shown, but on this it is almost impossible for a workman to stand.

The form of benching shown on the other side combines the two objects of preventing splashing and giving a good foothold at A. Three-quarter-round channel bends should always be used.

In the event of a stoppage in the sewer interceptor, drains and manholes become charged with sewage, and in that case it is important that manholes should withstand water pressure and remain watertight. An internal rendering of Portland cement, worked with a steel trowel to a perfectly smooth surface, is the most reliable means of accomplishing this. The rendering should be executed continuously from beneath the frame of the cover, over the benching on to the top of the channels. This is a better and less expensive finish than the use of glazed facings in a manhole, the joints of which are a source of weakness. All manholes should be built in hard stocks, to give a good key to the rendering. When drains become charged owing to an obstruction in the interceptor (the commonest cause) it is desirable that means should be provided for letting off the sewage, which otherwise would have to be baled out and conveyed to the sewer by hand before the obstruction could be removed. The provision of a stopper on the inspection arm with a "pickle-jar" top, which can be released by a chain from the top of the manhole, overcomes this difficulty by allowing escape to the sewer via the inspection arm.

The advantages of the various forms of covered

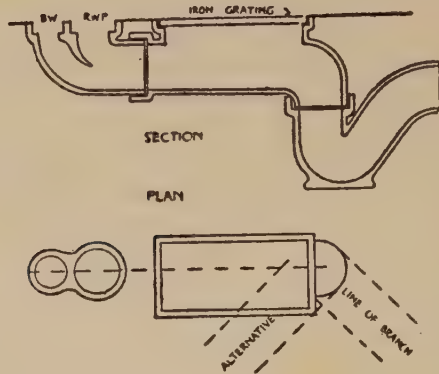


FIG. 64.

channel gulleys for bath, lavatory, and other wastes which have to discharge into the open air 18 in. distant from the drain trap, do not appear to be sufficiently realized, and one often sees such wastes discharging into roughly-made enclosures of brick-on-edge, from which overflow and splashing result. The side or back inlet below the grating is increasingly used for rainwater pipes, owing to the obvious advantage that when the grating is blocked with leaves, its efficiency is unimpaired. This advantage equally attaches to these disconnecting channels, with the added convenience that several wastes of different sizes may be neatly connected parallel with a wall, while the trap is set at any angle to suit the direction of the drain as shown in Fig. 64. If the branch does not connect directly with a manhole, it is advisable to place an inspection pipe next the trap, for removing obstructions.

Sink Taps.

No better instance of a little thing that matters could be given than that of the position of taps over a

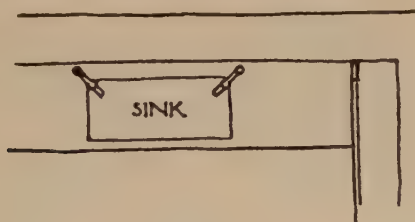


FIG. 65.

pantry sink. Once I was informed by an hotel manager that he had saved 50 per cent. of his considerable periodic bill for breakages of china and glass by removing the hot and cold cocks to the corners of the wash-up sink. In this position they are equally convenient for use, and they do not come so readily into collision with the articles being handled. (See Fig. 65.)

The runs of hot and cold supplies to an ordinary scullery sink are worth more consideration than is often given to them; in fact, the surroundings generally of such a fitting want study in the light of the operations performed. As to position; under a window is, of course, good, and if the cill can be kept about 4 ft. high, no great difficulty arises. Where the cill is necessarily lower it is well to have the sink so far out of centre with the window that the water services may have a fixing on the wall either to the right or the left. (See Fig. 66.)

The neatest and most effective way I know of fixing the hot and cold taps to iron barrel over the ordinary scullery sink is to use a tee instead of an elbow next the tap. The backward-looking arm of the tee is plugged by a 4 in. length of $\frac{3}{4}$ in. solid rod screwed in and pinned in cement to the brickwork, the

**Fixing Bibcocks
over Sinks.**

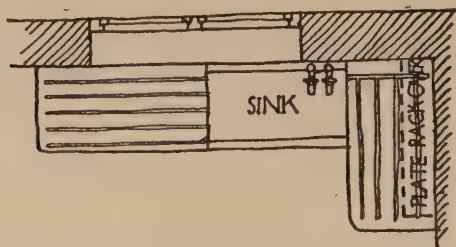


FIG. 66.

shoulder formed by the greater diameter of the tee lying against the wall face. This makes a perfectly rigid job, and is very much neater than any arrangement of clips or holderbats. (See Fig. 67.) A rather similar expedient which I have also found useful where hot and cold pipes approach from opposite sides of the sink is to fix both taps to one pipe with tees, the short length of pipe between the taps being plugged so that there is no waterway. This is a serviceable dodge when the level of the taps is close to a window-ledge above them.

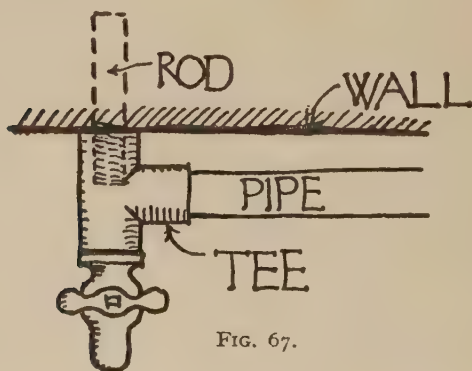


FIG. 67.

Every sink should have a draining board on either hand—one for dirty articles and the other for clean. The best position for the plate rack is over the right-hand board if it is fixed on the return wall, or over the left-hand board if at the back. Articles are normally held in the left hand and washed with the right, and a trial will convince one that this is the easiest position for use. A lodgment for soap, brushes, etc., should be provided; if the window cill is tiled this will serve the purpose, though some good sinks have a drained ledge provided, which is better. An angle position for a sink is not impossible, and is capable of almost "decorative" treatment in the form of a sort of retable or stepped gathering back of the corner space, which if covered with quarries makes an admirable reposing space for odds and ends. It pays to tile at least 12 in. high around the back of the sink and draining-boards, which otherwise always becomes greasy and shabby in a very short time. The height at which sinks should be placed above the floor level is a perpetual source of complaint and dispute. The lack of a final and conclusive solution is due to the many purposes for which a sink is liable to be used, and the varying stature of its users. If the sink is so high that a standing position is comfortable for the work to be done, then it becomes difficult to lift a full pail or heavy saucepan therefrom.

Draining-boards.

The windows of w.c.'s are often placed immediately behind the fitting. This is a natural but inconvenient

Sanitary Fittings.

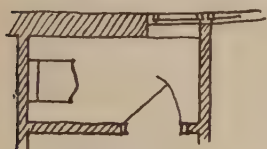


FIG. 68.

position, as it necessitates a twisted flush pipe and exposes the w.w.p. to the greatest risk of frost. A side position as Fig. 68, is probably the best and most

private. Baths of the ordinary "Roman" form should, whenever space allows, stand free to access all round, in the manner usual in hospitals, though such ample space on all sides is not necessary. Often the hot-water supply pipe may be so disposed as to serve as a convenient towel-airing rail, and if the scullery sink supply forms the end of the run it will usually give off some heat as well. If quick-acting draw-off cocks are used anywhere on a system under pressure, care should be taken that the supply pipe passes the cock with a butt-end above, which will act as an anti-concussive valve and check water hammer.

Gas-service.

Two points with regard to the gas service should be remembered. First, that the house connection from the meter should be by a T-piece with a blank drop below the outlet fitted with a screw plug, by which liquid in the pipes may be drawn off. Secondly, that an extension to the loft or roof space saves a great deal of anxiety during severe frosts, as tanks and pipes can be kept from freezing—usually by an ordinary gas-jet, or by one of the special heating burners now made.

Rainwater Pipes.

Rainwater pipes should be fixed so that it is possible to paint behind them. This is usually done now by using pipe distance pieces behind the ears. Where separate surface-water drainage exists there is great advantage in the use of side or back inlet gulleys for rainwater, as the gratings, being blocked by leaves or rubbish, do not impede the flow of water. A somewhat similar device is applied to sink waste gulleys by several makers of drain fittings, and is well worthy of adoption. (See page 66.)

Soil Pipes.

How often is a house of otherwise pleasing appearance sadly marred by the ostrich-like habit of pre-

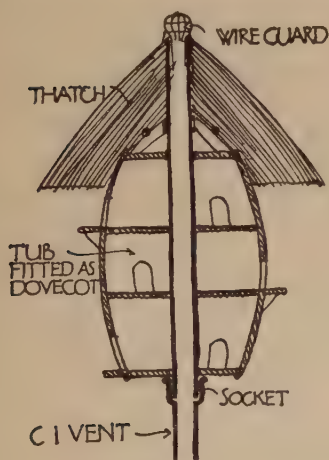


FIG. 69.

tending that soil and ventilating pipes are invisible, or, at any rate, omitting them from the elevational drawings. They should be just as much planned for as any other component, and a position adjoining a chimney or in a re-entrant angle is usually not impossible to attain. It should also be remembered that where there are dormer windows it will probably be

necessary that the ventilating head of the pipe should be carried above, which makes it still more imperative to think this matter out in advance.

If an isolated v.p. in connection with a cess-pool becomes a necessary but unsightly object in the kitchen garden, it may be humorously disguised by conversion into a standard dovecote. Fig. 69 is self-explanatory.

Who invented the unpleasant practice of making bath and lavatory wastes on upper floors discharge into rainwater heads? They are inaccessible collecting grounds for decaying soapsuds and fat. It is much better to pick up these lead pipes by double Y junctions on the iron waste, the lead branches being inserted in the side inlets and jointed with red lead. A wire rose should be fixed above the main pipe to ventilate the down pipe and prevent a discharge by one branch from syphoning the other trap.

Bath Wastes.

**Overflow from
Rainwater Butt.**

The customary methods of arranging this necessary adjunct are not wholly satisfactory. They are (1) a hole about 2 in. below the top of the butt, through which the water dribbles down the outside and finds its way (or perhaps not) into the drain below, and (2) a length of lead pipe down the side of the butt to direct the water to the drain. A better arrangement

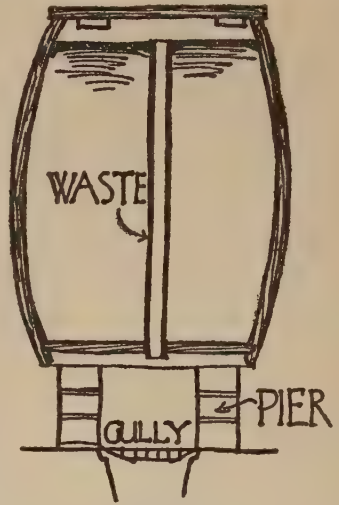


FIG. 70.

is an internal standing-waste, consisting of a length of iron barrel fitting in a hole bored in the bottom of the butt. This is invisible, and provides a means of emptying the barrel for periodical cleansing, merely by the removal of the waste pipe. (See Fig. 70.)

**Hot-water
System.**

How often is an otherwise satisfactory house marred by the complaint that really hot water is not readily obtainable? The trouble is often due to quite minor faults, which, though they may be easily avoided, are commonly committed.

The diagram, Fig. 71, shows a type of hot-water system frequently installed. Both the flow and the return pipes enter the bottom of the tank or cylinder, the latter being prolonged inside to deliver its water into the upper part of the storage space. This does not look like a serious fault, but it is, nevertheless, prejudicial. The hot water is cooled in passing

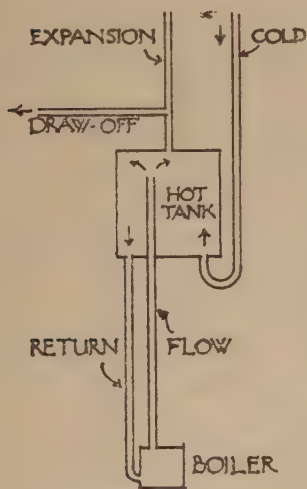


FIG. 71.

through 1 ft. of cold water in the cylinder as much as it would be in passing 50 ft. of air. Although in effect this heat is not lost, since it is given up to the water in storage, the water arrives cooler at the point from which supplies are drawn than need be the case.

The cold supply in the same diagram is introduced through the bottom of the cylinder. Remembering that the pressure of the cold supply is the

motive power of the low-pressure system, it is evident that each time hot water is drawn it will be because it is impelled by the cold water entering to replace it. When this upward direction is given to the cold supply its tendency is to rise in a stream—"shooting up" and mixing with the hottest water, which it cools down. If the cold supply must necessarily enter beneath, a tee should be fitted on the connection inside the tank as shown in Fig. 72, to divert and spread its flow.

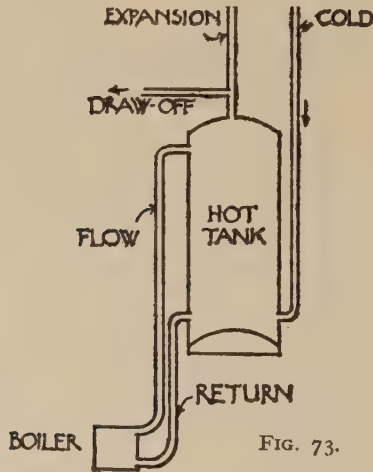
A better arrangement is shown in Fig. 73, in which the flow pipe enters at the side near the top, the return being taken off on the same side at the bottom, and the cold supply brought in opposite. Even where connections are correctly made the provision



FIG. 72.

of a tank or cylinder out of proportion to the boiler may result in dissatisfaction. About twelve to sixteen gallons per sq. ft. of boiler heating surface is considered good practice. Where existing apparatus, which is not in that proportion, has proved unsatisfactory, a simple remedy may often be arrived at merely by raising the return connection higher and so reducing the bulk of water circulating. This increases the heat attained—see Fig. 74, where the effective capacity of the cylinder is reduced from 50 to 30 gallons, since the dead water in the lower part will not circulate.

Akin to this expedient is the contrivance of a by-pass return pipe, as Fig. 74A, which may be brought into action by closing a fullway stop valve at X. This is very useful where alternative gas-heating is in use on the ordinary circuit, as the capacity of the



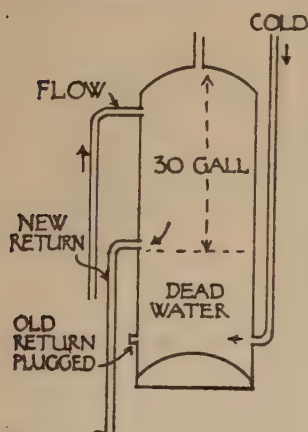


FIG. 74.

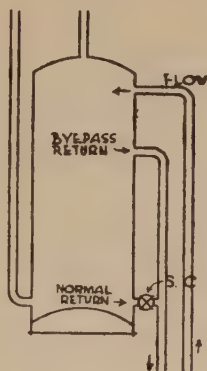


FIG. 74A.

tank may be reduced at will when this is in action, which is particularly advantageous where the gas circulator is controlled by a thermostat—bringing it into use much more rapidly and checking gas consumption.

Further points in connection with hot-water supply, which are worth attention, are as follows :—

(1) In case the flow pipe tapping of a range boiler is made otherwise than on top be very careful to see that it is as high up as possible—in line with the top inside; otherwise the packing of the boiler manhole will soon be burnt owing to the cushion of air trapped in the boiler (Fig. 75). If it is on top the same bad effect will follow should the pipe drop below the upper surface of the boiler.

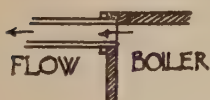


FIG. 75.

(2) The drain cock from a domestic boiler should be used

periodically to flush off dirt and deposit, as done in larger installations. For this purpose a fullway stop-cock or plug valve is best, and as running off is a messy business, it is convenient and can usually be arranged to extend from the cock to a position over an external gully or channel. Failing this, a screwed nipple adapter for a hose pipe should be fitted (Fig. 76).

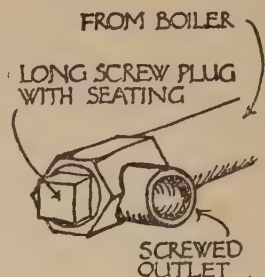


FIG. 76.

(3) Where pipes pass through brick-work (as at the back or side of an independent boiler), it is best not to build them in in such a way as to leave no latitude for slight movement. A metal sleeve or slip collar is the best solution, but if each pipe be wrapped in felt or old carpet before making good the surrounding brickwork that will serve the purpose.

Warning Pipes.

The plumber is usually so proud when he has committed a pipe that he loves to make it obvious. "Warning pipes" are a case in point, and these he delights in bringing through the roof slope in a prominent place with a lead slate and attendant complications. A very good place for the business ends to appear is through the eaves-soffit, to which they can be led between rafters.

CHAPTER 10

Plastering—condensation—ceilings—pavings—glazing.

SUCH frequent trouble is now experienced by **Plastering.** architects and builders in connection with plastering on walls and ceilings that it is evident that more attention might be bestowed on this most visible of a building's component parts. Perhaps the most common defect of all is a crazing of the surface with a network of fine hair cracks, quite distinct from the occasional more serious cracks and blisters caused by "blowing" particles of unslaked lime. This defect is probably as largely due to scanty application of "elbow grease" as to any other cause, though it is aided by too rapid absorption of moisture by dry undercoats. The remedy is the proper moistening of the surface of each coat of plaster before the next is applied, and insistence on the floating being consolidated by well scouring with a hand float and plenty of "elbow grease" after the stuff has been laid. This scouring should be done after the coarse stuff has stood long enough to permit of shrinkage and of the formation of a firm surface, but not so long as to allow it to become dry. The success of the work is wholly dependent on the workman performing the work evenly, neither missing any part nor scouring one part more than another. All floating should be scoured twice with an interval of between three and five hours, the scouring being done with a free-armed

circular motion until little or no moisture remains on the surface. The resulting texture is a close grained granular one showing traces of the circular sweeps of the workman's arm.

Condensation.

Since the days of distempered walls the evils of condensation have been very prominent; wall-paper having an absorbent surface is, of course, not subject to this trouble. It is now pretty commonly known that the evil may be mitigated if, in place of the customary smooth finish of the plasterers' setting coat, a granular or gritty finish from a wood or cloth-faced float such as described above is obtained. It might be thought that such a surface would more readily become soiled and dirty than the smoother set coat. Experience over some years has convinced me, however, that this is not so. It seems probable that the explanation is that most of the dust and dirt which adheres to a distempered wall does so when it is covered with beads or runlets of moisture by condensation; get rid of the condensation and the dust, though present, fails to stick.

Ceilings.

A similar gritty finish is even more pleasant in effect on a ceiling. If a free sweeping action of the arm is maintained, with a good pressure in scouring the finishing coat, almost an eggshell polish can be obtained. This gives so pleasant a surface that any further treatment by whitening or distemper is unnecessary. This texture is singularly suitable in conjunction with oak beams or panelling.

Pavings.

Red quarry pavings are improved immensely in appearance when they are laid with joints of $\frac{1}{4}$ in. and upwards. This is done easily if ordinary plasterers' sawn laths are laid temporarily in the joints when the tiles are bedded, the open spaces afterwards being flushed up with mortar after removal of

the laths. I have seen a hotel courtyard which had been paved with 9 in. quarries, and where the hardwood strips used in this way had been allowed to remain. Even this gave quite a good effect as well as a very sure grip for walking.

The wide joint has two advantages other than those with regard to appearance. The tiles that are not quite true to size can be used without their irregularity being apparent; and a space which does not exactly coincide with a definite number of tile-widths can be covered without cutting the tiles by an adjustment of the joints. Perhaps it is needless to insist on the superior look of quarries "laid square" and unbonded over the methods (once current) of "diagonal" laying, or bonding, which necessitated the use of half tiles of triangular or oblong form. A skirting one course high of similar quarries is a useful finish against plastered or distempered walls, preserving the finish when floor washing or sweeping takes place.

The fearsome arrangements of checker in red and buff or red and blue which once graced the suburban forecourt happily no longer please. What is true of paving tiles is true also of wall tiling, especially if the latter is not laid with the finest possible joints, and arranged checkerwise without "bond," i.e., with joints continuous both ways. Imperfectly white tiles set square checkerwise (unbonded) with a $\frac{1}{4}$ in. to $\frac{1}{2}$ in. joint (according to size of tiles from 3 in. to 8 in.) avoid all that distressingly mechanical effect suggestive of underground conveniences which wall tiling commonly has. Where it is desired to finish glazed wall tiling with a rounded edge it is better to use tiles of the ordinary size and shape upon which the edge is formed rather than a separate strip. Dutch and Belgian tiles are commonly obtainable in

this form, but in English tiles usually I have had to accept the separate "bullnose." It seems unlikely, however, that the round-edged tile is not made by someone in this country, too.

Brick floors are still used in many parts of the country, but I am convinced that it is a mistake to bed these down on cement. Even when they are laid on concrete I much prefer them in a bed of sand, as this permits the hollow-worn portions readily to be replaced. Where concrete or cement paving is laid, it still seems necessary to insist on the wisdom of dividing the surface by joints or "controlled cracks," rather than to allow the inevitable cracks to follow their own sweet will. *In situ* paving subject to temperature changes should not be laid in larger areas than, say, 6 ft. square without joints. The sections should be of convenient size, and should be laid alternately between guides or forms made up of wood strips. On removal of the strips, tarred paper should be placed against the free edges of the sections first formed, and the intervening spaces filled in.

Glazing.

With regard to glazing, there is not much to say; two little points, however, are important. First, be very careful about introducing bullions on a south aspect. I have known of cases where curtains have been ignited by these acting as burning-glasses focusing the sun's rays; second, where glazing is fixed with loose beads a better effect than usual is obtained if the ordinary bead is fixed projecting beyond the centre fillet as Fig. 77.



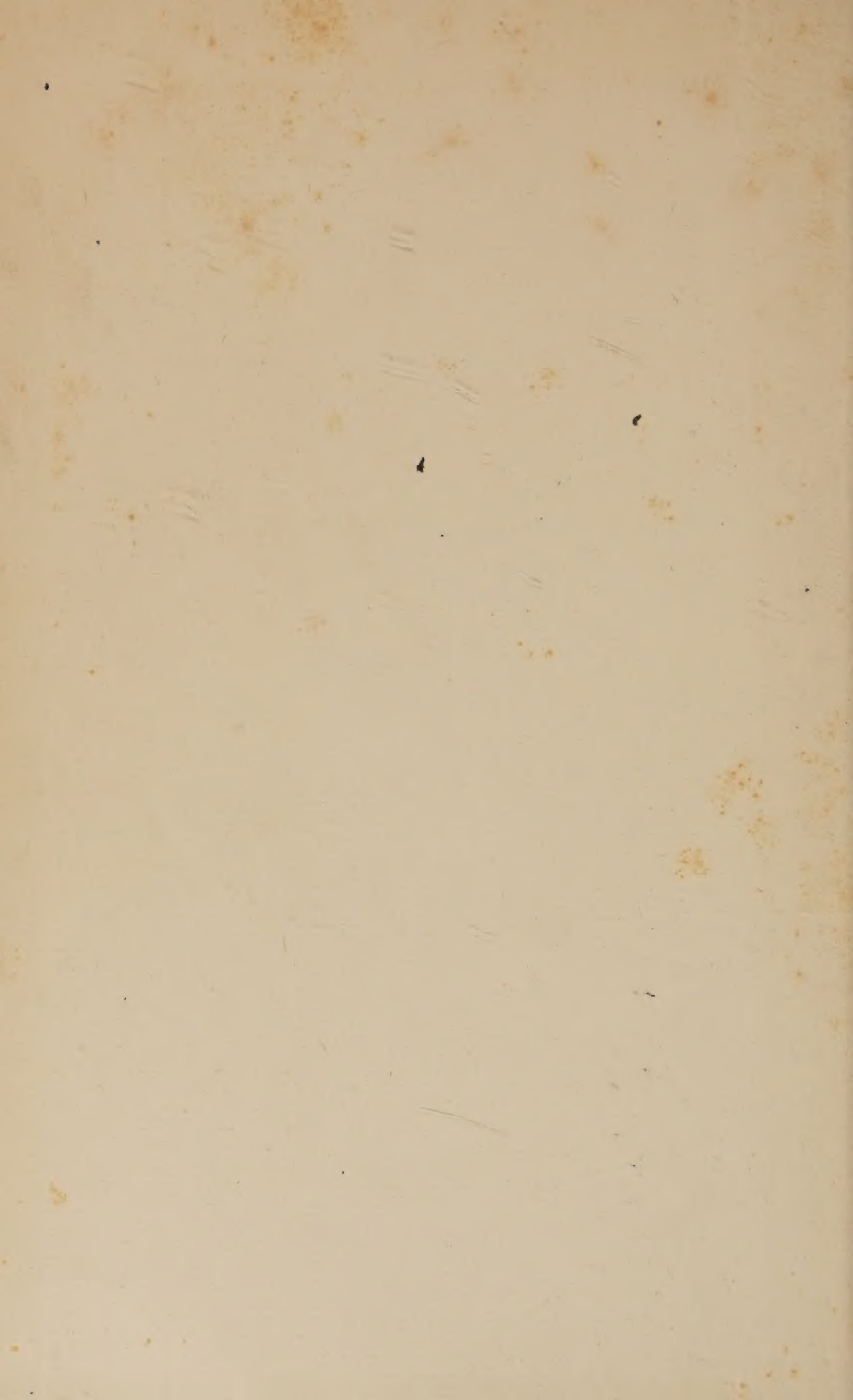
FIG. 77.

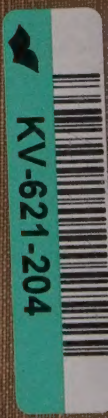
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